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NEW APPROPRIATIONS COPY

State Engineer's Office

IRRIGATION DISTRICTS

YELLOWSTONE COUNTY, MONTANA

*History, equipment, acreage irrigated
and potential irrigable acreage for
each project in the county*

1943

Prepared by State Engineer's Office
Gerald J. Oravetz, Assistant Engineer

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IRRIGATION REPORT FOR YELLOWSTONE COUNTY

(Preliminary)

By

Gerald J. Oravetz

Billings, Montana

October 1, 1943

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IRRIGATION REPORT FOR YELLOWSTONE COUNTY

By Gerald J. Oravetz,
Assistant Engineer

The data incorporated in this report were largely obtained by the survey method. Each water user was contacted and asked specific questions about their respective irrigated land. Data for the individual project reports were obtained from project managers or secretaries, water users and old-timers in the area. Data for ownership and water rights were obtained from county records. To obtain the location of irrigated lands, irrigation ditches, streams and other data, aerial photographs and ditch company records were used in conjunction with a field check. About eighty percent of the farmers contacted came into the office personally and, by the use of the aerial photographs, they were able to give us complete information pertaining to the location of their irrigated land.

This method was used for the entire county with the exception of the Huntley Project. Data for their irrigated land, seeped land and unproductive land were obtained from the Project records, while the location of canals, reservoirs, headgates and irrigated land were taken from aerial photographs with the use of maps and other data from the Project Office as an assistance.

In this report no effort has been made to analyze economic feasibilities, or the problems of the irrigated projects, or to make recommendations as to their future development. The facts presented are as we found them which provide the details and figures from which a detailed analysis may be made. Two sets of township maps were made on 2-inch to the mile scale which show the location of all irrigated land in Yellowstone County. The first set shows

land ownership, location of irrigation ditches, pumping plants, etc. Each tract also has a code number, which, when referred to the township summary, gives the name of the water user, section, township and range in which the land is located, source of water, acres irrigated from each source, present irrigated acres, potential irrigable acres, maximum irrigable acres, and *seeped acres per farm unit. The second set of maps shows by color the location of all the land irrigated under the various ditch companies, private users and pumping plants, as well as the location of all the main canals, pumping plants, main highways, railroads, towns and main rivers and streams.

Each township also has a complete summary which shows the name of the water user, code number (code number when referred to the ownership maps show the location of the irrigated land and the farm boundary), section, township and range, source of water, whether a user has a private irrigation system or is under a ditch company or irrigation district, number of shares held in ditch company, acres irrigated from each source, present irrigated acres, potential irrigable acres under existing facilities, maximum irrigable acres and seeped acres. The summary given in this report was tabulated from these township summaries to show the totals for the county as a whole.

* Seeped acres for the Huntley Project are for the project as a whole.

AGENCIES COOPERATING

For their assistance and inspiration in inaugurating and executing this study particular credit is due Fred E. Buck, State-Engineer and O. W. Monson, Head, Department of Irrigation and Drainage, Montana State College. Bill Jones, Yellowstone County Agent, H. O. Beeman, Chairman, Yellowstone County A.A.A. Office and Carl Yerrington, Yellowstone County Commissioner, have assisted in every way possible to make this project a success.

The listings to follow will acknowledge those whose assistance made this report possible.

Yellowstone County Agricultural Conservation Association:

H. O. Beeman, Chairman
L. J. Van Houten, Vice Chairman
John Folkerts, Member
Cleone A. Sass, Secretary
Betty Brookman, Treasurer
J. K. Mueller, County Field Supervisor

Yellowstone County Officials:

Charles Wicks, Commissioner
Carl Yerrington, Commissioner
Bill Fenton, Commissioner
Thurston Cochran, Assessor
George Ostan, Clerk and Recorder
Orville Berry, Treasurer

Montana Agricultural Extension Service:

Bill Jones, County Agricultural Agent
Jane Elze, Secretary

Bureau of Reclamation:

Carl Myers, Engineer in charge of the Billings office

Department of the Interior, Office of Indian Affairs:

Robert Yellowtail, Superintendent, Crow Indian Reservation
Clyde Lewis, Project Engineer
L. C. Rennick, Secretary

Agricultural Experiment Station:

O. W. Monson, Irrigation Engineer
C. H. Lyman, Statistician

State Engineers Office:

Fred E. Buck, State Engineer
Gerald J. Oravetz, Active Director of work
Margaret E. Kosko, Research Assistant
Ruth I. Hatvoldt, Secretary
Elizabeth Booker, Research Assistant
H. V. Bowen, Active Director of project for period of July and
August, 1942

Ditch Companies and Irrigation District Secretaries and others
cooperating and the names of the Ditch of District they represent:

Lloyd Lipp, Secretary

Big Ditch Group
Big Ditch Company
High Line Ditch Company
Snow Ditch Company

C. W. Laird, Water User
E. E. Tiffany, Secretary

Big Four Ditch Company
Billings Bench Group
Billings Bench Water Ass'n
Algeo Lateral
Homestead Lateral
Upper Lateral

Mrs. W. F. Weedman, Secretary
Paul Nilson, Secretary
Mrs. Leonard Smith, Secretary
A. W. Richardson, Secretary
L. C. Rennick, Secretary
J. Carter Johnson, Secretary
Lloyd Lipp, Secretary
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Mrs. Lelah Ogura, Vice-President
Mrs. W. L. Beaumont, Secretary
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E. L. Fenton, Secretary
John Bollinger, Secretary
D. F. Le Master, Secretary
H. J. Thompson, Commissioner
W. E. St. John Treasurer
W. E. Ogden, Secretary
L. J. Wallace, Secretary

Canyon Creek Ditch
Canyon Creek Lateral
Clarks Fork Ditch
Coburn Unit, U.S.I.D.
Coulson Ditch
Cove Ditch
Danford Irrigation District
Davis Ditch
Glenwood Ditch *
Grey Eagle Ditch
Huntley Project Irrigation D.
Italian Ditch
Lockwood Irrigation District
Miller & McGill Ditch
Old Mill Ditch
Pete Cooper Flat Irrigation C
Suburban Ditch
Victory Irrigation District
Waco Custer Ditch
White Horse Canal *
Yellowstone Ditch Co.
(Upper Cove Ditch)

* Ditch Company history not included in this report as the major
portion of the projects are not located in Yellowstone County.

SUMMARY OF IRRIGATED LAND FOR YELLOWSTONE COUNTY

As of January 1, 1943

<u>Source of Water</u>	<u>Acres Irrigated from each source</u>	<u>Potential Irrigable Acres</u>	<u>Maximum Irrigable Acres</u>	* Seeped Acres
<u>Big Ditch Group</u>				
Big Ditch	17,486.22	817.46	18,303.68	652.70
High Ditch	4,722.90	379.44	5,102.34	333.00
Snow Ditch	2,879.90	26.90	2,906.80	0.00
Big Four Ditch	504.40	132.60	637.00	20.00
B.B.W.A. Group	25,593.42	1,356.40	26,949.82	
B.B.W.A. Yellow R	19,547.85	2,755.63	22,303.48	894.60
Homestead	798.30	13.50	811.80	5.00
Upper Lateral	254.30	4.00	258.30	4.00
Canyon Creek Group	20,600.45	2,773.3	23,373.58	
Canyon Creek Ditch	7,013.35	246.07	7,259.42	104.00
Canyon Creek Lateral	110.00	12.40	122.40	0.00
Clarks Fork Ditch	609.10	51.90	661.00	0.00
Coulson Ditch	656.14	145.00	801.14	5.00
Cove Ditch	3,965.37	1,079.09	5,044.46	385.10
Danford District	606.37	147.00	753.37	12.00
Davis Ditch	181.55	65.00	246.55	16.00
Glenwood Ditch	63.00	0.00	63.00	0.00
Grey Eagle Ditch	1,364.30	58.30	1,422.60	32.50
Huntley Group	14,560.18	1,804.56	16,373.94	
Huntley Irrig. Proj.	28,142.98	2,970.00	31,112.98	200.00
Huntley Rental Water	1,097.12	0.00	1,097.12	0.00
Itslan Ditch	1,588.75	447.40	2,036.15	152.40
Lockwood Irr. Dist.	2,103.00	401.28	2,504.28	37.00
	32,931.83	3,818.68	36,750.53	

Total for River 200 93,694.00 9,752.97 123,447.87

	Acres Irrigated	Potential	Maximum	Seeped
Miller & McGirl	1,310.40	365.40	1,675.80	20.00
Old Mill Ditch	1,581.88	138.00	1,719.88	68.00
Pete Cooper Flat Irr. Co.	313.60	33.70	347.30	0.00
Suburban Ditch	1,051.40	6.50	1,057.90	2.00
Victory Irr. Dist.	1,431.40	224.00	1,655.40	88.00
Waco Custer Ditch	3,258.32	1,107.40	4,365.72	65.00
White Horse Canal	95.00	0.00	95.00	0.00
	9,042.00	1,875.00	10,917.00	
<u>Private Group</u>				
Big Horn River	74.00	35.00	109.00	0.00
Blue Creek	200.50	350.00	550.50	0.00
Broadwater Creek	2.00	0.00	2.00	0.00
Clarks Fork River	71.70	29.00	100.70	0.00
Coulee	90.00	0.00	90.00	0.00
Cow Creek	108.90	0.00	108.90	0.00
Danford Drain	56.50	0.00	56.50	0.00
Drain	163.80	0.00	163.80	0.00
Hogan Slough	134.00	0.00	134.00	0.00
Midway Drain	43.00	0.00	43.00	0.00
	944.40	414.00	1,358.40	
<u>Pryor Group</u>				
Pryor Creek	1,148.60	1,370.70	2,519.30	0.00
Coburn Unit	239.20	191.70	430.90	0.00
Seven-Mile Creek	140.00	00.00	140.00	0.00
Spring	6.00	0.00	6.00	0.00
Spring Creek	1.00	0.00	1.00	0.00
Twelve-Mile Creek	132.00	0.00	132.00	0.00
	1,666.80	1,562.40	3,229.20	

Total these pages

11,653.20

3,851.40

15,504.60

	Acres Irrigated	Potential	Maximum	Seeped
Well	0.25	0.00	0.25	0.00
Yellowstone River	2,057.06	512.60	2,569.66	0.00
Totals	107,405.41	14,116.97	121,522.38	3,096.30
	2,059.31	512.60	2,569.91	

* This figure does not represent the total seeped acres in the county as only farms that were irrigated are represented. Areas abandoned or slightly seeped are not included in this figure. In most cases this figure represents crop land that has been entirely put out of production because of seepage.

<u>Summary</u>			
Yellowstone	103,170.74	11,986.97	115,157.71
Clark Fork	1,341.47	308.60	1,650.07
Big Horn	1,505.40	259.00	1,764.40
Fryer	1,387.80	1,562.40	2,950.20
Grand Totals	107,405.41	14,116.97	121,522.38

THE BIG DITCH, HIGH LINE DITCH and SNOW DITCH COMPANIES

THE BIG DITCH COMPANY

The Big Ditch Company's canal, which was called from the first "The Big Ditch", was started in 1882 and finished in 1883. The first water was turned into the canal on July 30, 1883 and did not reach the end until September 14, 1883. There was no water filing made on "The Big Ditch". This canal was built by the Minnesota and Montana Land and Improvement Company, with H. W. Rowley as engineer and I. D. O'Donnell in charge of the construction. It was to have a capacity of 20,000 miner's inches, or 500 second feet. A part of the original plan was to have the water flow directly through all irrigation avenues of Billings to water lawns, gardens and trees, thus following the idea adopted by Brigham Young in Salt Lake City, Utah. The Company sold water at the rate of 75 cents per inch up to August 15th and \$1.00 per inch for the entire season.

The original construction required a great many structures, all built of wood, including the headgate and nine flumes, one of which was north of Laurel and contained over 100,000 feet of lumber. These wooden flumes soon rotted out and were rebuilt in 1888 and 1889. The second flumes lasted about ten years and in the rebuilding seven were replaced by the construction of large dirt fills. Drops were built at four different points, the heights of same being 20 feet, 30 feet, 15 feet and 10 feet respectively. The idea was to develop power at each of these drops for summer use, but this idea has never been put into effect.

The farmers under this canal took over the system on May 15, 1900. They organized a new company called "The Big Ditch Company," with a capital stock of 6,400 shares of a par value of \$10 each or \$64,000, the plan being that each quarter section of land would have 32 shares, or one share to each five acres of land. This represented 32,000 acres of land at a cost to the farmer of \$2.00 per acre. The corporation formed in 1900 was to exist for a term of 40 years, and at the annual and special stockholders meeting held on February 14, 1939 the corporate existence was extended for another 40 years from May 15, 1940.

The first headgate into the Yellowstone River was built in 1882 at a cost of about \$2,000. It was rebuilt in 1887 and again in 1898, and in October 1937 this headgate was removed and a new modern concrete and steel headgate was installed at a cost of \$19,500. This headgate is designed to carry 24,000 miner's inches, or 600 second feet of water. The canal is about 40 miles long, has approximately 350 lateral headgates or turn-out boxes and in 1942 had over 400 stockholders.

The entire system is gravity which helps to make it comparatively inexpensive to operate. Assessments are 50 cents per share, and, on the original plan of 32 shares for a quarter of land, each

assessment is \$16 and the average number of assessments per year has been about five, so on that basis it costs a farmer \$80 to irrigate his quarter section of land, or 50 cents per acre. This includes the operation and maintenance of the canal, repairs, interest on borrowed money and the repayment of borrowed money.

As large improvements have been necessary they have been built with reinforced concrete on a permanent grade. It is estimated that since the canal was started a total of \$200,000 has been spent on these permanent improvements, and all are paid for out of the yearly assessment. The present indebtedness of the Company is \$10,700.

The Allard, Nutting and Hesper drops were built in 1911; the Valley Creek syphon in 1914; the Schauer drop in 1915; the Nye spillway in 1916 of wooden stave pipe and replaced in 1932 with a 23-inch concrete pipe; and the Canyon Creek syphon in 1917. In 1942 there were 17,486.22 acres being irrigated under the Big Ditch in Yellowstone County with a potential acreage under existing works of 817.46 acres or a maximum acreage of 18,303.68 acres.

THE HIGH LINE DITCH COMPANY

In 1895 the High Ditch Company was organized and granted a 20-year charter. The construction of the canal was started immediately after receiving the charter. In 1928 the company re-incorporated for 40 years under the name of the High Line Ditch Company.

The High Ditch diverts water from the Big Ditch in the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ in Section 12, Township 2 South, Range 23 East in Yellowstone County. The capacity of the ditch has not been measured as it is considered a lateral of the Big Ditch.

The High Line Ditch Company has 2250 shares at \$10 par value. Each water user under the High Line Ditch Company must have two shares of High Line Ditch stock for every one share of Big Ditch Stock. The average assessments under the High and Big Ditch run about 50 cents an acre, which makes a total charge of \$1.50 per acre under the High Line Ditch Company. This makes the combined annual assessments for 160 acres \$240. The present indebtedness against the project is \$2,700. In 1942 there were 4,722.90 acres being irrigated under the High Ditch with a potential acreage under existing works of 379.44 acres or a maximum acreage of 5,102.34 acres.

THE SNOW DITCH COMPANY

The Snow Lateral Ditch Company was organized in 1907 and granted a 20-year charter. The construction of the main canal was started in the same year. On March 28, 1928 the company changed its name to The Snow Ditch Company and incorporated for 40 years.

The Snow Ditch diverts water from the Big Ditch in the NE $\frac{1}{4}$ of the NE $\frac{1}{2}$ of Section 4, Township 1 South, Range 25 East. The capacity of the ditch has not been measured as it is considered a lateral of the Big Ditch.

The Snow Ditch Company has a total of 1000 shares of which 642 have been issued with a par value of \$10. The balance of these shares are held in reserve by the ditch company. Each water user under the Snow Ditch Company must have one share of Snow Ditch stock for each share of Big Ditch stock. The average assessments under the Snow and Big Ditches run about 50 cents an acre, which makes the total charge of \$1.00 per acre under the Snow Ditch Company. The present indebtedness against the project is \$1,300.

In 1942 there were 2,879.90 acres being irrigated under this Snow Ditch with a potential acreage under existing works of 26.90 acres or a maximum acreage of 2906.80 acres.

THE BIG DITCH GROUP

The water cost under the three systems varies, as all water users under the High and Snow Ditches have 32 shares of Big Ditch stock for a quarter section of land, or the same amount of shares as the water users under the Big Ditch. In addition to these shares the user under the High Ditch must have two shares of High Ditch stock for every share of Big Ditch stock. Those under the Snow Ditch must have one share of Snow Ditch stock for every share of Big Ditch stock.

So the water charge under the three ditch systems would be as follows:

\$0.50 an acre under the Big Ditch
\$1.00 an acre under the Snow Ditch, and
\$1.50 an acre under the High Ditch.

This charge includes the operation and maintenance of the canal, repairs, interest on borrowed money and repayment of old debts.

For the most part the soils under the three projects are the same. The soils run from a silt loam to a heavy clay loam with occasional areas of lighter soils of the sandy type and some which might be classed as gumbo. Seepage has occurred on all three projects. The least under the High and the greatest under the Snow Ditch which has not only the problem of its own sub-surface water, but also that of the High and Big Ditches above it. Many private drains have been constructed which have reclaimed most of the area effected by seepage.

Agriculture is highly developed, and as these are among the oldest irrigation projects in Montana, farming is well established.

Sugar beets and beans are the leading cash crops. Considerable feeding of beef and sheep is carried on to utilize farm-grown feed crops, beet tops and beet by-products which are readily obtainable from the sugar beet factory in Billings.

The project is served by the Northern Pacific Railroad and U. S. Highway No. 10 which traverse the entire project. Along the railroad there are frequent sidings and beet dumps. U. S. Highway No. 10 is connected by a good system of gravel roads which bring the shipping points of Laurel and Billings close to all farms. A branch line of the Great Northern Railroad enters the middle of the project from the north.

Under the Big Ditch group in 1942 there were 25,089.02 acres being irrigated with a potential acreage under existing works of 1,223.80 acres or a maximum acreage of 26,312.82 acres.

THE BIG FOUR DITCH COMPANY

The Big Four Ditch is located about four miles south of Laurel on the south side of the Clarks Fork River. The point of diversion is in the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 8, Township 3 South, Range 34 East in Yellowstone County. Water is taken by gravity from the Clarks Fork River. The original appropriators were Charles Davis, Robert Miller, Tom Powell and A. C. Tompkins. The present ditch was first built and used in 1890. The Big Four Ditch is about four miles long and empties into Davis Creek, a tributary to the Clarks Fork River.

The Big Four Ditch was incorporated March 8, 1932 for 40 years with a capital stock of 1000 shares of a par value of \$20 each or \$20,000. The cost of water is \$1.50 an acre which is for operation and maintenance. The supply is considered adequate and is delivered for a six-month period. There are six water users under the system. The company has no indebtedness.

The principal crops are alfalfa, beets, beans and small grains. Some livestock is kept on all farms. Soils are a loam to a silt loam and are highly productive. The elevation of the project is about 3298 feet. The frost-free period is about 135 days while the annual precipitation averages about 14 inches.

The present headgate is an old wooden structure which the water users plan to replace and also change its location to a point some few hundred yards upstream so as to insure an ample supply of water during dry years.

The only recording on record in the Yellowstone County Court House in Billings pertaining to the Big Four Ditch Company is a certificate to increase the capital stock. "On July 10, 1914 a resolution was adopted to increase the capital stock of said Company

from \$4,000 to \$20,000. Said capital stock to be divided in 1000 shares of the par value of \$20 each instead of 800 shares of the par value of \$5 each. The said corporation is to divert the water from the Clarks Fork River which is taken out at a point on the east side of the river opposite the Mason siding on the ranch called "The Old Edwards Ranch," and the ditch contemplated to be owned by the said corporation is to extend from said point in a northeasterly direction for about four miles emptying into Davis Creek. Said water is to be used in irrigation of lands, among others the lands now owned and held by the said subscribers of stock in this corporation who are T. J. Powell, R. W. Mills, Charles T. Davis and E. E. Craig."

In 1942 there were 504.40 acres being irrigated under the Big Four Ditch with a potential acreage under existing works of 132.60 acres or a maximum acreage of 637.00 acres.

THE BILLINGS BENCH WATER ASSOCIATION

The Billings Bench Water Association, formerly a Carey Land Act Project known as the Billings Land and Irrigation Company, was incorporated in 1903 with a capital stock of \$300,000. The point of diversion is about one mile south of the city of Laurel in the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 15, Township 2 South, Range 24 East. From this point the water is conveyed 63 miles to a point in Section 28, Township 3 North, Range 28 East. The capacity of the main canal at the headgate is 425 cubic feet per second. If the flow in the main canal is not reduced by use, evaporation or seepage to 350 cubic feet at the Canyon Creek flume, any amount over 350 cubic feet is spilled, as the capacity of the tunnel north of Billings is 350 cubic feet. The tunnel is 1847 feet long. Diversions and losses reduce the 350 cubic feet passing the Canyon Creek flume to an average flow of 307 cubic feet at the tunnel. This amount is reduced to 20 cubic feet at the terminus of the main canal.

In 1939 the Association had an assessed irrigable acreage of 18,123 acres. Of this amount 2000 acres were west of Billings. The water charge under this portion of the ditch is based on an annual maintenance basis which varies from 30 to 60 cents per acre. The balance of the land under this system begins on the bench immediately north of Billings and extends north and east a distance of approximately 25 miles. On the Billings Bench the annual maintenance and operation costs of the irrigation system average about \$1.25 per acre. The total assessments collected since 1928 have averaged \$2.00 per share, or acre, per annum. The Association also has a turnout charge of \$2.50. This charge is more or less of an equalizer between the big and small users. The amounts collected in addition to the annual maintenance and operation cost are expended for administration betterments and debt service. Under normal circumstances it is anticipated that this rate of assessment will continue for some time to come.

The total amount of water delivered to water users in 1939 was 67,644 acre feet. The Association also supplies water to the Homestead Ditch Company and the Upper Lateral Ditch Company. These two ditch companies have a deeded water right and are maintained and operated by the users under the respective systems. The 2000 acres shown as being irrigated west of Billings include the acreage under these two systems. In addition to the Homestead and Upper Lateral Ditches the Association supplies water for the Crawford Lateral, the Algeo Lateral, Sunnyside Addition, Burnstead Addition and numerous other small users within the city of Billings and its suburban limits. Most of these users pipe or pump their water from the Association's main canal. These small users use the water principally to irrigate their lawns and gardens, having city water for domestic uses.

The water supply is considered adequate. A new headgate was constructed in 1928 which will insure ample water in dry years. This headgate is about one mile upstream from the original point of diversion. Water is usually diverted from the first of May until the last of August of each year. The irrigation water rights are appurtenant to the land by terms of the original water deeds.

The present value of the irrigation system is said to exceed \$1,000,000. Under the irrigation system there are: 19 concrete county bridges, 7 wooden county bridges, 11 wooden farm bridges, 1 rectangular wooden flume 6' X 13.5' and 580' long on Canyon Creek, 1 wood stave pressure pipe 3' in diameter and 1091' long on Alkali Creek, 1 metal flume 12' in diameter and 207' long on the first Five-Mile Creek, 1 concrete pipe culvert, 2 barrels 36" and 1 barrel 42" X 95' long on the second Five-Mile Creek, 1 rectangular concrete pressure conduit 6' X 7' and 80' long on Twelve-Mile Creek, 1 square concrete pressure conduit 5.33' X 5.33' and 67' long on Dry Coulee, 1 wood stave pressure pipe 58" in diameter by 895' long on Crooked Creek, 1 wood stave pressure pipe 36" in diameter and 1000' long on Razor Creek, 1 rectangular concrete pressure conduit 6' X 7' X 67' in Section 19, Township 5 North, Range 28 East, 1 wood stave pressure pipe 36" in diameter and 1000' long on Otis Coulee, 10 corrugated pipe culverts, 1 concrete pipe culvert, 3 vitrified pipe culverts, 5 wooden pipe culverts, 1 concrete check, 8 wooden checks, 29 permanent type turnouts, 1 permanent type sluiceway, 7 wooden sluiceways, 20 wooden overhead flumes and 53 wooden turnouts.

The following structures are located on the laterals: 1900' of metal flumes, 1645' of wooden flumes, 1900' of wood stave pipe, 422 wooden turnouts, 171 wooden check drops, 20 wooden sluiceways, 80 county road crossings, and 14 railroad crossings. The lateral and distribution systems aggregate some 190 miles in length. The capacity of these laterals varies from 3 cubic feet to 40 cubic feet.

There are two regulating reservoirs known as Holling and Rattlesnake, situated adjacent to the main canal, which have

storage capacities of 600 and 1,700 feet respectively. The reservoirs are filled from the main canal. There is no pumping in connection with this system.

Drainage has been installed for 3,377 acres with 2,600 feet being tile. There are 8000 acres in need of drainage. A drainage district, known as the Shepherd Drainage District, has been created to construct a drainage system in the vicinity of the town of Shepherd which is located 16 miles east of Billings. A loan of \$95,000 was granted the District by the Reconstruction Finance Corporation. There are 6,306.81 acres assessed for the repayment of the loan. The total area of the drainage district is 7,881.16 acres. There are about 3000 acres of seeped land which the District will reclaim. Bids for construction were let in July 1943 and McGary Brothers of St. Cloud, Minnesota were the successful bidders.

Soils vary from a light sandy loam to a clay loam and in general are very productive. The average precipitation is about 13 inches. The topography is bench land sloping to the southeast, lying well for irrigation and is crossed by five creeks.

The present indebtedness is \$164,000, or about \$8.00 an acre. The gross area of the project is about 25,000 acres. Originally 23,500 shares of stock with a par value of \$20 were issued. When the project was started it was planned that 27,000 acres were to be irrigated. In 1942 there were 20,600.15 acres being irrigated under the B.B.W.A. Canal (this figure includes Lateral Ditch Companies and sub-divisions) with a potential acreage under existing works of 2,773.13 or a maximum acreage of 23,373.58 acres.

Agriculture is highly developed and well diversified with alfalfa having the greatest acreage. Sugar beets, beans and peas are considered next in acreage in the order named with wheat, oats, barley and corn next in order. The acreage of tame pasture has increased steadily on the project because of the increased production of dairy cattle which outnumber all other livestock. Large numbers of beef cattle are brought to the project for winter feeding. There are also large numbers of poultry and hogs kept on the project. Truck crops, for which there is a good local market in Billings, are also grown to quite an extent.

On January 8, 1904 the Billings Land and Irrigation Company appropriated and filed on 600 cubic feet per second of water to be taken from the Yellowstone River by gravity at a point 1285 feet southwest from the quarter corner on the west line of Section 14, Township 2 South, Range 24 East which is on the north bank of the Yellowstone River. The purpose was to be for irrigation, stock, domestic purposes and general power. The main canal was to be 21 feet wide on the bottom, 39 feet wide on the top and 6 feet deep. The lands to be irrigated are described as lands in: Sections 1, 13, Township 1 North, Range 26 East; Sections 1, 3, 5, 9, 11, 15, 17, 19, 21, 23, 29 and 31 in Township 2 North, Range 27 East; Sections 23, 25, 27, 29, 33 and 35 in Township 3 North, Range 27 East and other lands adjacent.

The appropriation was made October 31, 1903. The appropriation is on file in the Yellowstone County Courthouse, Billings, Montana, in Book D, Page 269 of Miscellaneous Records.

THE CANYON CREEK DITCH COMPANY

The Yellowstone and Canyon Creek Ditch Company started construction in 1883 and water was applied to the lands under the ditch in 1886. In 1927 the company re-incorporated for 40 years under the name of the Canyon Creek Ditch Company.

The Canyon Creek Ditch Company takes water by gravity approximately on the quarter section line between Sections 29 and 30, Township 2 South, Range 24 East, which is about one mile west and two miles south of Laurel on the north side of the Yellowstone River. From this point the main canal runs northeast on the north side of the Yellowstone River to the east section line of Section 13 in the NE $\frac{1}{4}$ of the NE $\frac{1}{4}$, Township 1 South, Range 25 East, which is about a mile and a half west of Billings. From this point on to the city limits of Billings the ditch is known as the Canyon Creek Lateral Ditch Company. This company was organized to use the waste waters of the Canyon Creek Ditch Company. In 1942 there were 110,000 acres being irrigated under the Canyon Creek Lateral with a potential acreage under existing works of 12.40 acres, or a maximum of 122.40 acres. *

The maximum capacity of the Canyon Creek Canal is said to be 5400 miner's inches. The headgate is of steel and concrete and is so constructed as to insure ample water in dry years. There is a steel flume about 150 feet in length over Canyon Creek. The Company has a capital stock of 2000 shares of a par value of \$10 each. The indebtedness as of May 21, 1943 was \$7.50 per acre which is considered negligible as the soil is of good productivity and agriculture is highly developed. Water users are required to keep up their lateral systems as the water is delivered only out of the main canal. The cost of water per acre on an average varies from 75 cents to 80 cents per acre. This charge includes operation and maintenance of the canal, repairs, interest on borrowed money and repayment of old debts, etc. In 1942 there were 7,013.35 acres being irrigated under the Canyon Creek Ditch with a potential acreage under existing works of 246.07 acres or a maximum acreage of 7,259.42 acres.

There is some seepage on the project, but for the most part this has been corrected by private drainage systems. The topography is even with the exception of where Canyon Creek crosses the project. Sugar beets and beans are the leading cash crops with small grains grown largely for feed crops. Livestock is diversified with some cattle and sheep brought in for winter feeding.

Soils, climate and transportation facilities are the same as those of the Big Ditch Group.

The following appropriation made on July 31, 1920 for 4000 miner's inches of water to be taken by gravity from the Yellowstone River is on file in the Yellowstone County Courthouse in Book M, Page 372 of the Miscellaneous Records being filed by the Yellowstone and Canyon Creek Ditch Company.

"That the undersigned did on April 19, 1886 appropriate and claim, and by those presents does appropriate and claim four thousand (4000) miner's inches, or one hundred (100) cubic feet per second of time, legal measurement of the water of the Yellowstone River, and did on July 19th, 1920 mark the point of diversion by posting thereat a notice of appropriation of water right in a conspicuous place, which notice is in words and figures following, to wit: --

"That the Yellowstone and Canyon Creek Ditch Company did on April 19th, 1886 appropriate and claim four thousand (4000) miner's inches, one hundred (100) cubic feet per second of time, legal measurement, of the waters of the Yellowstone River, which appropriation was made in the following manner:

"1. On September 1, 1883 said appropriator began the construction of a ditch which tapped the Yellowstone River at a point two hundred fifty (250) feet southeast of the quarter corner between sections twenty and twenty-one in township two south of range twenty-four east, M. P. M. at which point the original headgate was constructed.

"2. Said ditch was completed in the month of July 1886.

"3. Water was first turned into said ditch and applied in the irrigation of lands lying under said ditch for the irrigation of which said ditch was constructed and said water appropriated on April 19, 1886.

"4. The original headgate was located as hereinabove set forth and thereafter moved to its present location on lot six of section thirty, in township two south of range 24 east, M. P. M. at which point this notice is posted.

"5. Said ditch, at the time of its construction, was, ever since has been and now is ten (10) feet in width on the bottom, two (2) feet deep and fourteen (14) feet in width on the top when on grade, the side having a slope of one to one.

"6. Said ditch runs in a northeasterly direction from its intake and headgate through, over and across sections 29, 20, 21, 15, 14, 11, 12 and 1, in township 2 south, of range 24 east of the Montana Meridian in Montana, and section 6, township 2 south of range 25 east and sections 32, 28, 27, 22, 23 and 13 in township

1 south of range 25 east, M. P. M. and ends in the northeast quarter of said section thirteen-(13).

"7. Said water was appropriated for, and ever since then has been used in the irrigation of six thousand (6000) acres of land lying in the above named sections and in other sections between said ditch and the Yellowstone River.

"8. The capacity of said ditch, headgate and all flumes is at least four thousand (4000) miner's inches or one hundred (100) cubic feet per second of time, which is the amount of water so appropriated and the amount now claimed by said appropriator has caused its corporate name to be hereunto subscribed by its president, attested by its secretary with its corporate seal affixed July 19th, 1920."

THE YELLOWSTONE AND CANYON CREEK DITCH COMPANY

By B. H. Hogan, President.

THE CLARKS FORK DITCH COMPANY

The Clarks Fork Ditch Company, also known as the Cramer Ditch, was incorporated in 1891 with a capital stock of 24 shares of a par value of \$100 each or \$2400. The point of diversion is in the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 19, Township 2 South, Range 24 East at which point water is diverted from a slough. Originally water was taken from the Yellowstone River. The total length of the main canal is about four miles. Assessments are made for operation and maintenance only.

The project is located immediately south of the city of Laurel. There are six users under the ditch. In 1942 there were 609.10 acres being irrigated under the Clarks Fork Ditch with a potential acreage under existing works of 51.90 acres or a maximum acreage of 661.00 acres. Agriculture is highly developed on the project with alfalfa and beets being the principal crops. Live-stock is kept on all farms. There is some seepage and a few private drains have been installed. The topography is generally level with a slight slope towards the Yellowstone River. The water supply is adequate. The elevation at Laurel is 3298 feet. The soils are from a loam to a clay loam and are considered very productive under irrigation.

On January 21, 1891 the Clarks Fork Ditch Company appropriated 10,000 miner's inches of water from the Yellowstone River, as well as 2000 miner's inches of all the waters of a certain slough running southeast through Sections 20 and 21, Township 2 South, Range

24 East. The appropriation was filed January 21, 1892. The said Company claimed all of the waters which drain into a pond near the right-of-way of the Northern Pacific Railroad in Sections 22 and 23, Township 2 South, Range 23 East, as well as all the waters which may now or hereafter run in any or all portions of said slough. Water was to be used especially for the irrigation of land owned by stockholders of the Clarks Fork Ditch Company to wit: - Lucius Nutting, Lucius A. Nutting, Ida Bundy, Elmer D. Clark, William Bode, Ward H. Cramer and Monroe Cramer who severally own NW $\frac{1}{4}$ Section 14, NW $\frac{1}{4}$ Section 12, NE $\frac{1}{4}$ SW $\frac{1}{4}$, Lots 3 and 4, Lots 1 and 2, N $\frac{1}{2}$ SE $\frac{1}{4}$, NE $\frac{1}{4}$, Section 14, SW $\frac{1}{4}$ Section 12, all in Township 2 South, Range 24 East, including the lands as said stockholders may now or hereafter own, including SE $\frac{1}{4}$ of Section 6, Township 2 South, Range 25 East owned by William Bode.

The original appropriation was made on April 1, 1881 and filed April 18, 1882. This appropriation calls for all the water that can be taken from the Yellowstone River. The point of diversion was given as a point in the north half of Section 21, Township 2 South, Range 24 East. The purpose was for milling, manufacturing or irrigation. The system was described as two miles of ditch running to land of the Clarks Fork Bottom and to connect with other ditches and dams or flumes that may be necessary. The joint owners at that time were listed as follows: John Young, Wilder M. Nutting, W. Bode, A. H. Mallory, L. A. Nutting and L. Nutting. Appropriations are on file in the Yellowstone County Courthouse in Billings, Montana in Book A, Pages 31 and 32 and 534 of Miscellaneous Records.

THE COBURN UNIT

(Crow Irrigation Project)

The Coburn Unit, a Crow Indian Irrigation Project, is located on Pryor Creek about 18 miles north and 9 miles east of Pryor, Montana, or about 6 miles south and 8 miles east of Billings, Montana. Water is taken by gravity from Pryor Creek in the NE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 2, Township 2 South, Range 27 East. The main canal is about 3 miles in length and was completed about 1901.

The present construction provides for the delivery of water to 440 acres. The water supply is inadequate and about 250 acres represent the maximum area that could be utilized by irrigation at the present time. Alfalfa is the principal crop which is raised for seed, with some acreage devoted to small grains. Livestock is kept on all farms but not extensively. The project is operated by the farmers who pay an assessment of 25 cents an acre to the Indian Department for each irrigated acre.

There is no data available as to the soils and climatic conditions. In 1942 there were 239.20 acres being irrigated with a potential acreage on the present irrigated farms of 191.40 acres or a maximum acreage of 430.90 acres.

THE COULSON DITCH COMPANY

The Coulson Ditch Company was created in 1895 and is located immediately southeast of Billings south of the Yellowstone River. It adjoins the Lockwood Irrigation District to the north. In 1942 there were 656.14 acres being irrigated under the Coulson Ditch with a potential acreage under existing works of 145.00 acres or a maximum acreage of 801.14 acres. The Coulson Ditch takes water from the same headgate as the Lockwood Irrigation District and is located on a secondary channel of the Yellowstone River about 100 yards west of the Lockwood pumping plant. When the water is high in the Yellowstone River water is diverted by gravity. When the river is low, water is pumped with a 14-inch, electrically operated water-lifter which is located at the Lockwood pumping plant and is operated by the operator of the Lockwood plant. The power charge is paid for by the Coulson Ditch Company. The water users in the Coulson Ditch report that when the river is low and the pumps of both the Lockwood and Coulson are in operation and no water is being taken by gravity there is a water shortage.

The average cost of water on the Coulson Ditch is \$1.50 per acre, of which 75 cents is for operation and maintenance and 75 cents for power which is supplied by the Montana Power Company. The altitude of the project is about 3000 feet. The annual precipitation averages about 14 inches. The topography is favorable to irrigation. The soil is a brown loam and is considered to be of good productivity. Seepage is no problem. Sugar beets are the principal crop. Truck gardening is common with some hay, small grain and beef and dairy cattle being raised. Farming is highly developed in the project.

The Coulson Ditch Company was formed in 1895 and on September 4, 1895 appropriated 3500 miner's inches to be taken by gravity from the Yellowstone River. The point of diversion was to be about 430 feet west from the center of the south end pier of the Northern Pacific Railroad bridge two miles east of Billings, Montana, in the northeast quarter of Section 34, Township 1 North, Range 26 East. The purpose was to be for irrigation, domestic uses, mechanical and watering of stock or rental uses. The system was described as: ditch and flumes. The ditch to be six feet wide on the bottom, nine feet wide across the top and three feet deep, running northeast along the valley on the south side of the Yellowstone River.

The description of intended place of use was described as: Lands lying along ditch and principally upon the lands lying below the line of ditch thereof in the Yellowstone Valley between head of said ditch and the Huntley Bluffs about six miles northeast from head of ditch. Eban N. Jones, George Miller, John Colander, Lionel I. Hammond, Andrew J. Sullivan, Clarence E. Kirk, D. A. Hammond and George L. Gamble associated together to form the Coulson Ditch Company.

THE COVE IRRIGATION COMPANY

The Cove Irrigation Company was organized January 14, 1941 to succeed the Cove Irrigation District which was organized in 1922 to succeed the Cove Ditch Company which was organized May 8, 1909.

Water is taken by gravity from the Yellowstone River about 12 miles west of Park City in Stillwater County. From this point the canal extends eastward into Yellowstone County to about 7 miles northwest of Billings. The total length of the main canal is nearly 50 miles, with a carrying capacity of 300 cubic feet per second. The present headgate was built in 1923 and is rather unusual in construction as it extends, tubular in design, some 50 feet from the intake, down the main ditch, allowing Hensley Creek, a tributary to the Yellowstone River, to pass over part of this portion of the structure which eliminates the danger from washouts from high water in the creek and debris from accumulating in the ditch. The headgate is so constructed that water can be diverted from the Yellowstone River in dry years or when the river is at a low stage. Other works along the main ditch are about two miles of concrete lining along the rimrocks west of Park City, a concrete flume over Allen Creek and a steel flume across Canyon Creek, which, along with the main canal, represents about 100,000 dollars in construction costs.

The first twelve miles of the ditch carry water for the district plus an additional 3100 miner's inches which must be delivered free to the farmers of the Yellowstone Ditch Company, formerly owning and operating this part of the Cove Irrigation Company Ditch. The Yellowstone Ditch Company did not relinquish their water right and still operate as a separate company. The obligation to deliver free this 3100 miner's inches of water plus the length of the canal makes the cost per acre of water rather high. The average cost since 1934 has been \$4.00 per acre, being divided as follows: \$1.75 for bonds and interest, 25 cents for reserve fund and \$2.00 for operation and maintenance. The present indebtedness of the project is \$139,500.

When the main canal was first constructed it was made with sufficient carrying capacity to irrigate 3000 acres above the ditch by pumping. It is estimated that the required lift would be within 60 feet. This project is said to be feasible and with electric power now available the necessary construction to place this 3000 acres under irrigation could be accomplished whenever the Cove Irrigation Company may desire to do so.

In 1942 there were in Yellowstone County 3,965.37 acres being irrigated with a potential acreage under existing works of 1,079.09 acres or a maximum acreage of 5,044.46 acres.

A survey was made by the Cove Irrigation District in 1934 which showed 4,060 acres as being irrigable under the ditch system.

There are approximately 1550 acres which have a high water table. Seepage is a real problem in the district and will not be solved until a master drain system is constructed with all drain ditches leading into main drains which will carry the waste water to the Yellowstone River, with provisions made for maintenance after the drainage system is completed. Lining the main canal where it passes over gravel and other rock formation would also help alleviate the seepage problem.

The topography is favorable for irrigation. The elevation of the project varies from 3400 feet at the west end to 3100 feet at the lower or east end. The annual precipitation averages from 13 to 14 inches. The frost-free period averages about 131 days with the last killing frost occurring about the middle of May. The soils vary from a river silt to a clay loam with some heavy soil with strong alkali content. The project is a long narrow strip of land having the Big and High Ditches for its southern boundary and the Cove Ditch for its northern boundary. It varies in width from a quarter of a mile to two miles at its widest point which is where Canyon Creek crosses the project.

Sugar beets and beans are the leading cash crops on the project while alfalfa and small grains are grown for feed crops as there are considerable livestock on the project. These feed crops are used with by-products from the sugar beet factory for fattening sheep and cattle during the winter months for market. Cattle from near-by ranges are also taken to the project for winter feeding. The project is served by the Northern Pacific Railway, which follows the entire length of the project and brings shipping points close to all farms as there are frequent sidings and beet dumps. The Great Northern Railway cuts across the lower end of the project. U. S. Highway No. 10, a paved highway, and several good gravel roads bring the shipping points of Laurel and Billings within easy reach of all farms on the project.

THE COVE DITCH COMPANY

On May 8, 1909 the Cove Ditch Company filed on 500 cubic feet per second of water to be taken by gravity from the Yellowstone River, the water to be diverted at a point where the notice was posted which is a point 150 yards west from the residence of J. L. Montgomery in Section 5, Township 3 South and Range 21 East. The purpose was for irrigating 10,000 acres of land in the Yellowstone Valley in Yellowstone County and other useful and beneficial purposes. Water was to be carried by a ditch running in a northeast direction above land of stockholders and other lands to be irrigated by or through said ditch terminating in the south half of Section 30, Township 1 North, Range 25 East. The appropriation

was filed for record in Yellowstone County May 12, 1909, Book F, Page 330 Miscellaneous Records. No description of place of intended use was given.

THE YELLOWSTONE DITCH - UPPER COVE

The date of first use is not known. The first certificate was issued in 1893. The first meeting of the stockholders was June 21, 1893. The company was set up under the arrangement of 300 shares representing 3000 inches of water of which 299.58 shares are outstanding. Articles of Incorporation were filed July 18, 1893 in Yellowstone County.

Article III - The Yellowstone Ditch Company has organized for the purpose of appropriating 5000 inches of the waters of the Yellowstone River and purchasing irrigating ditch and water rights in the Yellowstone River on land of the Yellowstone Cattle Company as decreed by District Court in Yellowstone County, June 15, 1893. Term of corporation, 40 years. The trustees for the first three months were Charles Temple, John Walch, Charles R. Watkins, George R. Cummins and George C. Tilden. The original Article of Incorporation is on file in Yellowstone County.

THE OLD TUTT DITCH

Edward S. Tutt on May 12, 1890 appropriated and filed on 1500 miner's inches of water to be taken by gravity from the Yellowstone River. The point of diversion being in the NE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 5, Township 3 South, Range 21 East. The purpose was for irrigation, watering stock and other purposes. The ditch was to be 24 inches by 60 inches. The appropriation is filed in Stillwater County, Book 2, Page 238 of Miscellaneous Records.

AGREEMENT AND CONTRACT BETWEEN THE YELLOWSTONE DITCH COMPANY
AND THE COVE DITCH COMPANY

As recorded in the County Court House in
Stillwater County

On January 25, 1906 the Yellowstone Ditch Company sold its ditch or canal to The Cove Ditch Company with a right of way with the width of 66 feet. The agreement written and signed by both parties hereby follows:

This indenture entered into by both parties, The Yellowstone Ditch Company and The Cove Ditch Company and existing under and by virtue of the laws of the State of Montana and doing business in Yellowstone County, Montana, Yellowstone Ditch Company party of the first part and The Cove Ditch Company party of the second part witnesseth.

That whereas the party of the first part is now the owner of a certain water right taken out of the Yellowstone River and is also the owner of that certain canal taken out of the Yellowstone River near Rapids in said Yellowstone County, the same being an enlargement of what was formerly known as the old Tutt Ditch and which said canal carries to the Stockholders of the said party of the first part an amount of water variously estimated from 1000 to 3000 inches statutory measurement, said quantity of water, however, to be measured and determined as is hereinafter provided.

And whereas, the ranches of the Stockholders of the party of the second part are so situated that by extending the canal of the party of the first part water can be conducted through said ditch to and upon all of their ranches so that they can have an adequate supply of water for the necessary irrigation thereof.

And whereas, the most feasible and cheapest method of carrying water to the lands of the Stockholders of the party of the second part is by enlarging and extending the canal of the party of the first part.

And whereas, such an enlargement will require a right-of-way throughout the entire length of the original canal of the party of the first part of the width of sixty-six feet, which said width of right-of-way throughout the length of said ditch passes through and over the lands belonging to the stockholders of the party of the first part, who have each and everyone of them agreed to convey to the party of the first part a right-of-way of the extent hereinbefore mentioned along the line of said canal at all places where said canal passes through the said lands of the stockholders of the party of the first part,

And whereas, the parties have, after due consideration, concluded and agreed among themselves that it is for the mutual benefit and advantage of themselves and all the stockholders of each of them that the party of the first part grant and convey to the party of the second part upon the conditions hereinafter named, the said canal with all its appurtenances, including the right-of-way therefor, to the extent of sixty-six feet throughout the entire length thereof, where it runs through and over the lands of the stockholders, of the party of the first part, for and upon the consideration that the party of the second part shall enlarge the said canal and shall at all times after the completion of said enlargement furnish to the party of the first part or its several stockholders in proportion to their respective interest in the stock of said company such an amount of water as the said canal now carries, the amount of said water to be determined by a measurement hereafter to be made and in the manner hereinafter stated; provided, however, that nothing herein contained shall be construed as a conveyance of the water right of the party of the first part; and provided further that the said party of the second part shall only be required to furnish such water during the irrigating season of each and every year hereafter; and provided also that nothing herein contained shall be considered as requiring the party of the second part to furnish the party of the first part the full amount of water herein contracted to be delivered to it when on account of extreme low water in the river it is impossible to carry the requisite amount of water therefor in said canal or when on account of unavoidable accident it is impossible to operate said ditch for the time being. The party of the second part, however, is to use all proper diligence and reasonable care to keep the requisite amount of water flowing in said canal to provide the party of the first part with water at all times and to repair any and all breaks or damages which may be done to said ditch by unavoidable accident or otherwise. The party of the second part is to enlarge said canal and the headgate thereof at its own proper expense during such season of the year as will not in any manner interfere with the use of the water thereof by the party of the second part at any time during the irrigating season, and further agrees at all times to do and perform all necessary work and furnish all necessary material in the repair of said ditch from year to year.

It is further understood and agreed between the parties, that the party of the second part shall, subject to the conditions of this agreement, have at all times the full and complete control of said canal after it shall have enlarged the same and shall at its own expense keep a ditch-walker on said ditch whose duty it shall be to see that the water agreed to be furnished to the party of the first part shall be turned out to the stockholders thereof in such quantities as the stockholders shall be entitled respectively, and according to their respective shares of stock in the party of the first part. The said party of the second part also agrees to reconstruct and to operate said canal so that the level of the water therein shall at its normal height rise to the same elevation in said canal as it rises at the present time and so that it will flow

through the headgates of the stockholders of the party of the first part as now located or as they may be located at any time prior to the time the party of the second part may commence the enlargement of said ditch or as may at any time hereafter be constructed by the mutual consent of the parties hereto. The party of the second part also agrees that in case earth or material shall be deposited in the parallel laterals running near said canal or any of the stockholders of the party of the first part by the party of the second part in the enlargement of said ditch, then the party of the second part shall either remove such earth or material and restore the said lateral or shall construct immediately below the same another parallel lateral on the same grade and of the same capacity of the lateral so obstructed by earth and material.

It is further mutually agreed that the ditch-walkers of the party of the second part shall at all times when advised by any of the stockholders of the party of the first part that such stockholders do not wish to use the whole or any part of the water coming to them to close down the headgate of such stockholders and to allow said water to flow on down the canal. The party of the second part also agrees to carry out the contract of the party of the first part with James L. Montgomery as to furnishing him water out of the said canal.

It is further mutually agreed between the parties hereto that the actual amount of water to which the party of the first part is entitled under this contract shall be hereafter determined by the measurement of the present carrying capacity of said canal in the following manner. The party of the first part shall select a Civil Engineer and the party of the second part shall also select a Civil Engineer, who together shall proceed to measure the capacity of said canal by computing the number of inches which shall be actually flowing through the same by means of the W. & L. E. Gurley Electric Motor, and in the event that said Civil Engineers shall disagree as to the amount of water flowing through said canal they two shall select a third Civil Engineer and a decision of a majority of said Civil Engineers shall be binding upon the parties hereto and conclusive as to the carrying capacity of said canal. Said measurement shall be made as early in the spring of 1906 as it is practical to make the same, and provided that the party of the first part shall have the privilege of cleaning out the said canal, but in no event shall the party of the first part or any other party make an enlargement of the said canal or remove at any point therein earth or rock in a place which has not heretofore been removed in the construction thereof.

It is further mutually agreed that the party of the second part shall have the right to begin forthwith the enlargement of the canal of the party of the first part at the lower end thereof and to extend such enlargement to within one-half mile of the headgate of said canal prior to the measurement hereinbefore provided for, and after such measurement shall have been made to continue the work on to the headgate of said canal and to prosecute work thereon

until such a time as the irrigation season shall begin in the year 1906; provided, however, that the party of the second part in the prosecution of said work of enlargement shall in no manner delay or prevent the stockholders of the party of the first part from irrigating their lands under said canal nor so as to prevent water flowing through the said canal to their respective headgates as hereinbefore provided;

And whereas, at a meeting of the stockholders of the party of the first part duly held on the 25th of January 1906, at which said meeting all of the stockholders of said party of the first part gave their written consent endorsed upon the records of said company to allow the transactions to be had at such a meeting by signing their names thereto and upon the records of said company as before stated, the following resolution was passed by a unanimous vote in its favor:

Be it resolved, that it is for the best interest of the Yellowstone Ditch Company and of each and everyone of the stockholders thereof that the said company convey to the Cove Ditch Company by good and sufficient deed the canal of this company, together with the appurtenances thereof, and together with the right-of-way over the lands of the stockholders of this company of the width of sixty-six feet throughout the entire length of said canal where it passes over the lands of such stockholders upon the said Cove Ditch Company and its stockholders agreeable to contract and agreement this day entered into between this company and said Cove Ditch Company, and which said agreement shall be fully set forth and declared in the conveyance hereafter to be made in pursuance of this resolution.

Be it further resolved, that the board of directors of this company be directed and required to carry out these resolutions and to cause to be executed the necessary deeds and writings therefor;

And whereas, thereafter the board of directors of the party of the first part at a meeting called therefor and at which said meeting all of the directors of said company were present, and having under consideration the resolution of the stockholders meeting above referred to, duly passed the following resolution, to-wit:

Be it resolved by the Board of Directors of the Yellowstone Ditch Company that in conformity with the resolutions of the stockholders of this company this day made, it is for the best interest of this company and of all and everyone of the stockholders thereof that the said company convey to the Cove Ditch Company by a good and sufficient deed the canal of this company, together with the appurtenances thereto, and together with a right-of-way of the width of sixty-six feet along the entire length of the canal of this company where the same passes through or over the lands of the stockholders of this company for the consideration set forth in the resolutions made at said stockholders meeting hereinafter referred to.

Be it further resolved that the president and the secretary of this company execute to the Cove Ditch Company a conveyance in conformity with these resolutions and to the resolutions of the stockholders of this company heretofore referred to and deliver the same to the said Cove Ditch Company upon its acceptance thereof in due form and subject to the conditions thereof.

Now, therefore, in pursuance of said resolutions and in consideration of the premises and of the fact that the party of the second part has by resolutions of its Board of Directors accepted of the conditions and terms mentioned in said resolution and agreement above set forth as made by the stockholders and directors of the parties hereto and of the sum of one dollar, to it in hand, paid by the party of the second part, the receipt of which is hereby acknowledged, the said party of the first part doth by these presents grant, bargain, sell, convey and confirm unto the said party of the second part and its successors and assigns forever the following real estate situated in the County of Yellowstone and the State of Montana, to-wit: All of its right, title and interest in and to the canal or ditch known as the canal of the Yellowstone Ditch Company, beginning at a point on the north bank of the Yellowstone River in the County of Yellowstone, in the State of Montana, in lot nine in section five, in township three south of range twenty-one east, Montana Meridian, running thence in a general easterly direction through sections five, four, nine, ten, eleven, twelve, three and one, in township three south, range twenty-one east aforesaid and passing through in the same general direction through sections six, seven and five in township three south, of range twenty-two east, Montana Meridian and ending near the south line of section thirty-two in township two south of range twenty-three east, Montana Meridian. Also the right-of-way for said canal and the easement therefor where the said canal passes through, over or upon the lands of the stockholders of the party of the first part the same being of the width of sixty-six feet. Nothing in this conveyance shall be construed as a transfer of the water right and appropriation of the waters of the Yellowstone River as heretofore acquired by the party of the first part. Together with all and singular the tenements, hereditaments and appurtenances thereunto belonging or in anywise appertaining, reserving, however, at all times and perpetually the right of the party of the first part and of its stockholders to receive from said canal the amount of water belonging to them as hereinbefore stated in this conveyance whenever they shall need or require the same during the irrigating season.

It is mutually understood and agreed between the parties to this conveyance that the consideration hereof is the continual supply from year to year to the party of the first part by the party of the second part of the amount of water hereinbefore mentioned, and that this conveyance shall be valid only so long as the party of the second part shall substantially comply with its agreement and with the conditions of this conveyance. And upon the failure of the party of the second part to supply said amount of water herein provided for at the time and in the manner provided

for herein, the property hereby granted in whatever condition the same may be at the time of such failure as aforesaid shall, together with all the additions, accretions and improvements then revert to and become the property of the party of the first part or of its successors and assigns. Nothing herein, however, shall be construed as giving the party of the first part by reversion or otherwise any interest whatever in the ditch or canal which shall hereafter be constructed by the party of the second part below the terminus of the canal of the party of the first part.

The party of the second part agrees that it will replace all bridges which it may remove from the ditch of the party of the first part with bridges equally as good as the bridges now spanning said ditch.

The party of the first part agrees that water shall cease to flow in its canal on and after October 1, 1906, and until the next ensuing irrigating season in order to allow the party of the second part to begin work or to complete the enlargement of said canal.

It is further agreed that water shall not be turned into said canal in the spring of 1906 until May 1, 1906 except for the purpose of measuring its capacity and further agree that they will select their Civil Engineer and have him assist in measuring the capacity of the ditch at the earliest date at which water can be made to run through said canal for the purpose of measuring same, upon being notified by the party of the second part that they are ready to measure the said canal. The party of the second part agrees to pay the expenses of measuring said canal. The measurement of the carrying capacity of said canal shall not include the water to which the said James L. Montgomery is entitled. When the party of the first part is ready to begin cleaning said canal in the spring of 1906 as hereinbefore provided, it shall so notify the president of the party of the second part so that the party of the second part may have its agent upon the ground while said work is being done if it so desires.

In witness whereof, the party of the first part has by the resolution of its Board of Directors caused these presents to be signed by its president and secretary and has affixed herunto its corporate name and seal.

THE YELLOWSTONE DITCH COMPANY

By (Signed)

John C. Holdane,
President

S E A L

By C. A. Railsback,
Secretary

STATE OF MONTANA)
)
)
COUNTY OF YELLOWSTONE)

S. S.

On this 25th day of January A. D. 1906, before me, W. M. Johnston, a Notary Public and for said county of Yellowstone, personally appeared John C. Holdane and C. A. Railsback, known to me to be respectively the President and Secretary of the Yellowstone Ditch Company, the Corporation that executed the foregoing instrument and acknowledged to me that such Corporation executed the same.

Witness my hand and Notarial Seal the day and year in which this certificate was written.

W. M. Johnson

NOTARIAL SEAL

Notary Public in and for
Yellowstone County, Montana

STATE OF MONTANA)
)
)
COUNTY OF YELLOWSTONE)

S. S.

The Cove Ditch Company, the grantee in the foregoing conveyance, in pursuance of a resolution duly passed upon this day by its Board of Directors, acting under authority of its stockholders, hereby accepts the foregoing conveyance with all its conditions and limitations and agree to faithfully carry out all of the conditions and obligations therein stated.

In witness whereof the Cove Ditch Company by resolution of its Board of Directors has caused these presents to be signed by its President and Secretary and its corporate name and seal to be hereunto attached this 25th day of January 1906.

COVE DITCH COMPANY

By W. R. Westbrook,
President

By F. W. Schauer,
Secretary

In 1910 the Montana Fruit and Irrigation Company, a company dealing in orchard lands and irrigation canals published the following in a publication called "Long Live King Apple."

"The Cove Ditch Company, a mutual corporation, organized under the irrigation, or reclamation, laws of the State of Montana, have fully completed and in successful operation an irrigation canal, over thirty-four miles in length, taking its supply of water from the Yellowstone River and passing through the lands of the Montana Fruit and Irrigation Company. It is from this permanent and ample quantity of water that the lands of our company will obtain their necessary supply. In addition thereto, or supplementing this amount, is the waters of Canyon Creek which bisect the fruit tract, emptying its surplus or overflow water into an extensive reservoir for temporary conservation in case of need during the growing season.

"The Cove Ditch Company own and have a valid title to the perpetual use of twenty thousand acre inches of water passing through this canal, which is a greater quantity of water, by twice over, than enough to abundantly irrigate all the lands under or tributary to the ditch.

"Each purchaser of one or more of our fruit tracts becomes a mutual, or pro-rata, perpetual owner in this Company, with interest in the twenty thousand acre inches of water without any other, or additional, cost of any kind whatsoever, except that of maintenance. All the work of the ditches and diversion dam has been thoroughly well done in a workmanlike, solid and permanent manner, thus reducing to a minimum the annual charge for maintaining its present physical condition.

"The permanency of the supply of water for each and every purchaser has been safeguarded in every manner practicable.

"The Yellowstone is one of the nation's great waterways and like the Columbia has its source high up in the perpetually snow clad peaks of the Rocky Mountains, whose supply of water from melting snow, is unfailing.

"The very large and beautiful Yellowstone Lakes, situated in the National Park of the same name, are the great natural reservoirs from which the river derives its initial supply, countless mountain streams join in its journey to, or near, our lands, assuring an abundant and equable amount of water at all periods of the year, and especially during the summer months when the snow in the higher altitudes is melting.

"Every foot of the lands of our Company can be abundantly irrigated from the Cove Ditch Company canal, in which you will become a mutual owner, free of any and all additional cost, except maintenance, which at most should not exceed one dollar per acre per annum.

"The laterals are now under construction and the land will be ready for planting in the spring of 1910. Two steam plows during September prepared 1280 acres which were seeded to winter wheat, next summer the unplanted portion will be summer fallowed.

"Profiting by the experience of the older states, Montana wisely rejected the old laws of riparian rights which have caused so much litigation in Colorado, California and other states, and enacted laws placing the entire water supply under the control of the state.

"In Montana there are 1,200,000 acres under irrigation and thousands more will be irrigated in the near future. Irrigated farming in Montana has been an unqualified success for many years and offers an almost certain opportunity for the farmer to become independent. There can be no question that far more money can be made from forty acres of Montana irrigated land than from the average 160-acre farm in the central states.

"This seeming paradox is true. As a result of exhaustive analysis the fact has been established that soils of the arid regions contain a much larger supply of plant food than those of humid regions - three times as much potash, six times as much magnesia and fourteen times as much lime. In arid regions these indispensable elements have been conserved to the soil through untold centuries; in humid regions they are carried into the country drainage and through the rivers into the ocean. Thus, with the application of water, as needed, the arid soil has a fertility unknown of in humid regions."

This is typical of the propaganda used in the early development of Montana in bringing settlers from the east. It is plainly seen that no thought was given to drainage by the early planners of irrigation systems.

THE DANFORD IRRIGATION DISTRICT

The Danford Irrigation District is located between the Yellowstone and Clarks Fork Rivers in Yellowstone and Carbon Counties about eight miles southwest of Laurel. The point of diversion is in the southeast quarter of Section 13, Township 3 South, Range 23 East in Carbon County. The water is taken by gravity from the Clarks Fork River on the west bank. Water is adequate except in dry years. The project was started as the Mason Ditch Company about 1900. Later it became the Danford Ditch Company and was organized as the Danford Irrigation District in 1920.

The total irrigable land in the District amounts to 1220.23 acres with 606.37 acres of this amount in Yellowstone County. The total amount of money required to be raised in the year 1943 for

general administrative expenses of the District, including costs of maintenance and repairs and interest, was \$1220.23 which makes the water charge \$1.00 per acre. The average charge does not exceed \$1.00 per acre and is often less.

The elevation of the project is about 3,400 feet and the estimated annual precipitation is about 13 inches. The average frost-free period is approximately 125 days. The topography is favorable for irrigation. Drainage has not been a problem as the project is not troubled with seeped land. A branch line of the Northern Pacific Railroad extending from Laurel to Red Lodge traverses the project with frequent shipping points and sidings. A paved highway (U. S. 12 and 310) traverses the project which gives access to markets of Laurel and Billings the year around. The soil is very productive, being generally of a silt loam with occasional outcrops of gravel and heavier soils. Agriculture is highly developed with beets and beans the principal crops. No great amount of livestock is kept on the farms.

The Clarks Fork River has done considerable damage to crop land along its banks. Some of the farmers estimate they are losing from one to two acres of land each spring by river washing during the spring run-off.

Early history: "The Danford Ditch Company incorporated March 8, 1913 in Carbon County. It was bonded for \$21,000 to be paid by special tax and assessments upon all the land included within the Danford Irrigation District. At a meeting to decrease the capital stock from \$40,000 to \$30,000 the following stock owners were present: T. L. Wilkins - 141 2/3 shares, M. D. Hartley - 75 shares, R. Fritz 141 2/3 shares, E. L. Merritt - 150 shares, J. W. Klamor - 141 2/3 shares, G. E. Van Doren - 141 2/3 shares, O. M. Warfield - 50 shares, and Joseph Kinnick - 80 shares and Ida A. Byam - 100 shares voted by proxy.

"At the above mentioned meeting a resolution was adopted: That the Danford Ditch Company purchase all the property, interest and franchises of the Mason Ditch Company, a corporation organized under the laws of the State of Montana, for the sum of \$1.00 and for the surrender of all the capital stock of the said Mason Ditch Company to the Danford Ditch Company and all its property, and the cancellation thereof the stockholders of the Mason Ditch Company."

THE DAVIS DITCH COMPANY

The Davis Ditch is located about one mile southeast of Laurel between the Yellowstone and Clarks Fork Rivers. It is about one mile from the Yellowstone River across the project to the Clarks Fork River which empties into the Yellowstone at the lower end of the project. Water is taken by gravity from the Yellowstone River in the southeast quarter of the northeast quarter in Section 21,

Township 2 South, Range 24 East in Yellowstone County.

The first ditch was constructed by Sam and Anna Davis when this part of Yellowstone County was part of the Crow Indian Reservation. Anna Davis was a Crow Indian and Sam, her husband, a white man. Mrs. Albert Kozelka, one of the present directors of the ditch, and who has lived in this area all of her life, said the present ditch was used in 1899.

The Davis Ditch Company was incorporated November 26, 1904 "to build and construct irrigation ditches, acquire, own and control water rights, use the water therefrom in irrigating our own lands, and sell and lease shares and interest in said company for the irrigation of other lands and in general to carry on such a business as is usually conducted by a corporation formed for the purpose of reclaiming land by irrigation. The Corporation is to exist 20 years. The directors were: W. E. Adkinson, E. L. Wolverton, H. M. Nikolas, all of Carbon County. Capital stock: \$5,000." The Company was re-incorporated on March 18, 1935 with a capital stock of 1000 shares of a par value of \$5.00 each or \$5,000.

The elevation of the project is about 3300 feet. The estimated annual precipitation is about 13 inches. The average frost-free period is approximately 125 days. The soil is generally of a silt loam. Water is adequate except in dry years. There are 650 acres in the project of which about 250 acres are irrigable. There is much truck gardening on the project with Laurel and Billings the principal markets. Hay and beets are the principal crops on the larger farms. There is some seeped land on the project.

The cost of irrigation is very low. The average cost since the project was first put into operation is about 30 cents per share, or about \$1.05 per acre on an average basis. The Company has no indebtedness.

THE GREY EAGLE DITCH COMPANY

The Grey Eagle Ditch Company was organized August 16, 1902 to succeed the Newman Ditch which was organized May 9, 1898. All water rights of the Newman Ditch were transferred to the Grey Eagle Ditch Company. The Company was reincorporated in 1927 with a capital stock of 200 shares of a par value of \$10 each or \$2000. Of these 146.5 shares have been issued. The Company also serves water to a number of users on a rental basis. These users do not hold shares in the Company but pay a flat rate for the water they use each season. The cost of water varies from 45 cents to 75 cents an acre. This cost includes charges for operation and maintenance. The Company has no indebtedness, and, as of December 31, 1942, had a cash balance of \$648.40.

In 1942 there were 1,364.30 acres being irrigated, with a potential acreage under existing works of 58.30 acres or a maximum acreage of 1,422.60 acres.

The project is located within and just south of the city of Billings. Water is taken by gravity from the Yellowstone River in the NW $\frac{1}{4}$ of Section 21, Township 1 South, Range 26 East. From this point the main canal runs in a northeasterly direction for about one mile, at which point it divides into two branches; one branch running almost due north into the city of Billings, the other following the general course of the Yellowstone River to a point in the south half of Section 34, Township 1 North, Range 26 East. The total length of the main canal system is about seven miles. The capacity of the main canal is about 72 second feet. In a year of extremely low water in the Yellowstone River the headgate at the point of diversion would have to be lowered or a dyke constructed in order to insure an adequate supply of water.

Soils are a loam to a silt loam and are highly productive. There is some seepage on the project. An intensive type of farming is practised on the project with truck gardening taking considerable acreage because of the nearness and availability to the market in Billings. Dairy cows and poultry are kept on most farms. Data on climate is the same as other projects in this area. The elevation of the project is about 3100 feet.

The date of the appropriation was June 14, 1902 and on August 16, 1902 the Grey Eagle Ditch Company filed on 5000 miner's inches of water or 125 cubic feet per second to be taken by gravity from the Yellowstone River in Lot 1, Section 20, Township 1 South, Range 26 East on the north bank of the river. The purpose was for irrigation, domestic and other uses. The system was described as a ditch running northeast to a point in the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 16 where said ditch divides. The north part runs northwest and upon lands in Section 2 and the south part runs northeast; (no description of the lands covered by the south part is given).

The ditches were described as: The main ditch, 8 feet wide on the bottom and 4 feet deep; the north branch 4 $\frac{1}{2}$ feet wide on the bottom and 1 $\frac{1}{2}$ feet deep; the south branch 5 $\frac{1}{2}$ feet wide on the bottom and 1 $\frac{1}{2}$ feet deep. The lands to be irrigated were in Sections 2, 10, 11, 14, 15, 16 and 20 in Township 1 South, Range 26 East. It is also stipulated in the appropriation that the first appropriation was made on May 9, 1898.

The appropriation is on file in the Yellowstone County Courthouse, Billings, Montana, in Book C, Page 600 of Miscellaneous Records.

THE HUNTLEY PROJECT IRRIGATION DISTRICT

(Federal Reclamation Project)

The Huntley Project was authorized in 1905 and construction was started the same year. The Huntley Irrigation District was created in 1921, and in 1928 it was given the management and operation of the project under government contract.

The determined construction charge varies from \$40 to \$68 an acre. The operation and maintenance assessment for the year 1943 was fixed at \$1.60 per irrigable acre for the full rate land and 80 cents per irrigable acre for the half rate land. The total assessment to be collected by the County Treasurer was determined to be \$40,501.91 to be assessed against 22,501.59 acres of full rate land and 5,641.39 acres of half rate land. The assessment of U. S. Contract Charges was determined to be \$12,761.49 which is also collected by the County Treasurer from the owners of consenting land under the terms of the contract of January 2, 1927 between the United States and the Huntley Irrigation District. The actual cost for the operation and maintenance under the gravity system for 1942 was 90 cents per acre, while the cost under the pumping system was \$2.90 per acre, 90 cents of this is for ditch maintenance making the average cost under the pumping system about \$2.00 an acre.

There are two 43½-foot lifts from the main canal to the high line canal. The high line canal has a capacity of 100 cubic feet per second. One lift is a hydraulic unit of 640 horsepower, having two pumps with a design capacity of 35 second feet each, operated by a 34-foot drop. The other is a 400-horsepower Diesel operated unit having two pumps with the design capacity of 23 second feet each. This unit is powered by two 200-horsepower, semi-Diesel engines. The area served by these pumping plants is about 5000 acres.

The water for the Huntley Project is taken by gravity from the Yellowstone River in the SW¼ of the SE¼, and in the SE¼ of the SW¼ of Section 34, Township 2 North, Range 27 East. There are two tunnels with their intakes about one-quarter of a mile apart through which water is diverted to the main canal. These tunnels have a 6-inch concrete lining and are nine feet two inches wide and nine feet four inches high at their crest. There are three tunnels on the project having a total length of 2,654 feet. A low level dam having a total length of 324 feet is constructed across the south channel of the Yellowstone River just below the lower tunnel. This dam is constructed so that water can be diverted into the lower tunnel when the river is low by using flash boards. It has been estimated that during dry years there are only about 1200 second feet of water passing these headgates in the Yellowstone River. There are about 117 miles of open drains and wasteways, 225 miles of closed drains and 235.45 miles of irrigation canals. The main canal is 34 miles long having a present capacity of 575 second

feet. When the project was first constructed the main canal was built with a capacity of 400 second feet, but it has since then been enlarged. The high line canal is about 12 miles in length and the reservoir line canal about ten. The three canals have a total of 200 miles of laterals. Anita Reservoir, which is used as a supply reservoir, has a storage capacity of 5000 acre feet. There are seven syphons of metal and concrete construction on the project and a 121-foot concrete flume over the main canal through which Pryor Creek is diverted.

The Huntley Project is located about 15 miles east of Billings in Yellowstone County on the south side of the Yellowstone River. Huntley is on the west end of the project with an elevation of 3000 feet, and Pompeys Pillar, which is located on the eastern end, has an elevation of 2874 feet. The annual precipitation from 1907 to 1927 was 12.08 inches and from 1928 to 1940 was 10.34 inches. The frost-free period is approximately 135 days. The topography is even with a gradual slope to the Yellowstone River which facilitates irrigation. The soils are typical river bottom silt with occasional outcrops of clay loam. There are about 10,000 acres of unproductive land, having from flat clay areas, somewhat alkaline, to areas that have a strong alkaline content which are not suitable for cultivation. The soils throughout the project are of a heavy type.

The gross area of the project is 32,500 acres with 29,590 acres in farm units, 200 acres being classed as sheep land and 10,000 acres as unproductive. Agriculture is highly developed with alfalfa having the greatest acreage. Beets, beans and peas follow in the order given, with wheat, oats, barley, and corn next in order.

There are about 2500 acres in tame pasture which were developed because of the increased production of dairy cattle which are kept in considerable numbers. Large numbers of beef cattle and sheep are brought to the project for winter feeding. There are also large numbers of poultry and hogs kept on the project.

In addition to the 28,142.98 assessed acres under irrigation on the project, there are 1,097.12 acres outside of the boundaries of the Huntley Project which are irrigated from the project ditches, the water being purchased from the Project. Near the Anita Reservoir the Project has 1,020 acres of potential land which can be irrigated by lifting the water 20 feet, and near Huntley there are 1,950 acres of potential land which can be irrigated by having two pumps, one of a 15-foot lift and the other a 35-foot lift. Plans have been made to irrigate these two areas.

On behalf of the Secretary of the Interior of the United States of America, H. N. Savage, on October 26, 1905, filed on and appropriated 750 cubic feet per second of water to be taken by gravity from the Yellowstone River at a point in the SW $\frac{1}{4}$ of Section 34, Township 2 North, Range 27 East on the south bank of the stream. The purpose was for irrigating 35,000 acres on the right bank of

the Yellowstone River below Huntley and developing power for pumping, domestic and other uses. The system was described as a tunnel 110.4 inches wide and 108.48 inches high with a double headgate with each opening being 60 inches by 84 inches, which carries and conducts 750 cubic feet per second of water from the Yellowstone River at a point on its right bank in the SW $\frac{1}{4}$ of Section 34, Township 2 North, Range 27 East, and runs thence under the Northern Pacific Railroad tracks, and then, by means of a tunnel and open ditch, follows closely the line of the railroad to Huntley. Thence it follows the general direction of the Burlington Railroad to Ballantine, thence one branch continues along the Burlington Railroad to Fly Creek and the other branch follows the valley to Bull Mountains, bluffs about one and one-half miles beyond Bull Mountain station on the Northern Pacific, thence over said land, and:

That the said United States of America is the appropriator of said water and said appropriation was made on the 26th day of October, 1905 and said appropriation and the diversion of said waters is to be effected and consumed by means of said ditch, tunnels and headgates, And:

That the said United States also hereby claims said ditch and the right-of-way therefor and said water by it conveyed from point of appropriation to point of final discharge, also the right of location upon any lands of any dam, flumes, reservoirs constructed, or to be constructed by H. N. Savage, in using said water.

H. N. Savage duly authorized by the Secretary of the Interior of the United States

The appropriation was filed in the Yellowstone County Courthouse, Billings, Montana, in Book E, Page 106 of Miscellaneous Records.

THE ITALIAN DITCH COMPANY

The Italian Ditch Company project is located on the north side of the Yellowstone River in Stillwater and Yellowstone Counties. From its point of diversion, which is in the east half of Section 34, Township 2 South, Range 22 East in Stillwater County, the main canal extends some seven and one-half miles in a northeasterly direction to near the center of Section 13, Township 2 South, Range 23 East, at which point the ditch divides. One lateral runs northeast about a mile and a half to the quarter corner between Sections 8 and 9, Township 2 South, Range 24 East. The other lateral runs due east for a mile and a half, then northeast to the city of Laurel and then southeast to a point in the NE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 15, Township 2 South, Range 24 East. When the river is high, water is diverted from a point in the east half of Section 35, Township 2

South, Range 22 East which was the original point of diversion.

About 1933 the Yellowstone River changed its course and left the original intake high and dry. These being extremely dry years very little water was available and the Company was faced with the problem of saving the crops of its water users by supplying them with water. Plans were made to install an electrically operated pumping plant. While these plans were being negotiated an agreement was reached with the Canyon Creek Ditch Company giving the Italian Ditch Company permission to purchase water from them. As a result the plans for a pumping plant never materialized.

At the same time the Old Mill Ditch Company was also having the same trouble supplying water to its users, its headgate being located on the same channel just below the Italian headgate. The two companies then decided to construct a new intake and headgate about one and one-half miles upstream on the main channel of the Yellowstone River and divert water into the old channel of the river, or the channel on which their headgates were located. This plan called for the abandonment of the Old Mill headgate using only the Italian headgate on the old channel which is used to divert water for both the Italian and Old Mill Ditches. The water for the Old Mill Ditch is carried to Valley Creek at which point it is spilled and diverted into the main canal of the Old Mill Ditch Company. Construction and maintenance charges for this new portion of ditch were divided between the two companies each paying 50 percent of the costs. This portion of the ditch is still operated under this agreement. The companies also jointly employ one ditch rider.

The Italian Ditch Company was first organized in 1893 and its first set of by-laws adopted. The Company filed its corporation paper again in 1913 for a 20-year period. On March 7, 1942 the Company reincorporated for a period of 40 years for \$40,000. There are 1,707.50 shares in the Company which are all issued and which have a par value of \$10 each. According to the Company records there are 3,925 acres of irrigable land on the project. The Company has no record giving the capacity of their main canal. The average cost of water is about \$1.00 per acre. The system is all gravity and has no structures of any consequence. The Company has no indebtedness and has some money in reserve.

In 1942 in Yellowstone County, there were 1,588.75 acres being irrigated with a potential acreage under existing works of 447.40 acres or a maximum acreage of 2,036.15 acres.

The principal crops are small grains, hay, beans and beets. Considerable livestock is kept on the project and some winter feeding is done. The topography is fairly even. The soils are from a loam to a clay loam with occasional outcrops of gravel. On the project there is considerable seeped land which for the most part is used as pasture. The elevation of the project is about 3300 feet. The frost-free period is approximately 130 days. The annual

precipitation is about 13 inches. Park City and Laurel are the principal shipping points.

On March 23, 1882 the Italian Ditch and Flume Company filed and appropriated 16,000 miner's inches of water to be taken by gravity from the Yellowstone River at a point near the southwest corner of Section 31, Township 2 South, Range 23 East. The purpose was to be for agriculture and milling purposes. The system was described as a ditch or canal with no dimensions given. Water was to be conveyed through the south half of Section 31 and 32 in said township; thence through the north half of Section 33; thence through the north half of Section 26; thence through the south half of Sections 23 and 24, Range 23 East; thence through Sections 19, 18, and 17 in Township 2 South, Range 24 East. The original appropriators were: Venia Battista, George Geer, George Herbert, and August Rodgers. The appropriation is on file in the Yellowstone County Courthouse, Billings, Montana, in Book A, Page 30 of Miscellaneous Records.

On September 21, 1896 the Italian Ditch Company appropriated 5000 miner's inches of water to be taken by gravity from the Yellowstone River from a point in Section 35, Township 2 South, Range 22 East. The appropriation was filed October 2, 1896. The purpose was for agriculture and other useful purposes. The description was described as a ditch to convey water. This appropriation is on file in the Yellowstone County Courthouse, Billings, Montana, in Book 2, Page 77 of Miscellaneous Records.

THE LOCKWOOD IRRIGATION DISTRICT

The Lockwood Irrigation District was created in 1913 and is located immediately southeast of Billings, south of the Yellowstone River. The gross area of the project is 2630.62 acres. In 1942 there were 2,103.00 acres being irrigated with a potential acreage under existing works of 401.28 acres or a maximum irrigable acreage of 2,504.28 acres.

The district has had considerable trouble supplying water to the water users because of breaks in its pipe lines and motors and pumps giving out when the load is the greatest during the peak of the irrigating season. The pumps are turned on late in the spring and shut off early in the fall so that the period in which water is available for irrigation is less than that of other projects in this area. The water is pumped from a canal which also carries water for the Coulson Ditch. This canal diverts water from a secondary channel of the Yellowstone River which fills in with brush, logs and silt during the high water period making it hard to get sufficient water to the pumping plant when the Yellowstone River is low. There are three centrifugal, electrically

operated pumps at the pumping station: one 16-inch for the 60-foot lift with a capacity of 7,500 gallons per minute and two 14-inch for the 100-foot lift, each having a capacity of 6000 gallons per minute. A 10-inch centrifugal pump was used on the 150-foot lift which is now abandoned.

The assets of the Lockwood Irrigation District consist of the canal, pipe lines, pump-house and pumping plant, which are valued at from \$80,000 to \$100,000. There are also 1,110 acres of land of which 745 acres are classed as irrigable. These lands have been sold on the crop payment plan at about \$40 per acre. These lands were acquired by the District from Yellowstone County by taking assignments of tax sale certificate, securing deeds and then quieting title to same. For the year ending February 28, 1943 there were \$1,211.28 in delinquent assessments on the District. The total power charge for the operation of the electric motors at the pumping station for the project for 1942 was \$5,395.58. The power cost is 55 mills per KWH. The cost for maintenance and operations in 1942 was \$3,193.89. For the year ending February 28, 1943 there were \$31,500 in bonds outstanding and \$48,745.55 in registered warrants making a total of \$80,245.55. These are held as collateral by the Federal Reserve Bank of Minneapolis, Minnesota, for loans aggregating \$67,500 borrowed from the Reconstruction Finance Corporation.

The altitude of the project is about 3100 feet. The annual precipitation averages about 14 inches. The frost-free period averages approximately 135 days. The topography is favorable to irrigation. The soil is a brown loam and is considered to be of good productivity. The project has no seepage problems and because of the topography these are not likely to develop.

Sugar beets are the principal crop. Truck gardening is common with a good market in Billings. There are some dairy and beef cattle with feeding lots for beef cattle and sheep because of the nearness and availability of the sugar beet factory for beet by-products which are used to supplement their farm grown feeds.

The cost of water varies from \$7 to \$8 an acre. With this high cost and short use of water the water users say it is more of a load than they can bear, as it takes an extremely high yield and good prices in order to meet this obligation. The assessments for 1942 were divided as follows: 25 cents for reserve fund, \$2.50 for bonds and interest, \$3.50 for power (Montana Power Company), and 75 cents for operation and maintenance. In addition to the district assessment the taxes average approximately \$1.00 an acre.

Some years ago plans were made and a preliminary survey conducted to estimate the cost of taking water from the Billings Land and Irrigation Company Canal north of Billings. It was found that the Billings Land and Irrigation Company's Canal was of sufficient height to make a syphon system feasible which would eliminate the

present pumping plant, but because of the financial condition of the Lockwood District the plan was dropped. The plan was also discredited by the Billings Land and Irrigation Company because it would have called for the enlargement of their main canal from the syphon to the point of diversion on the Yellowstone River.

Because of the bad condition of the pipe lines there has been under discussion a plan to move the present pumping plant upstream some several hundred yards. This plan would call for one pipeline and it is felt that sufficient pipe could be salvaged from their present pipe lines for the new line. The lift would be shorter and they would have a direct intake from the Yellowstone River which would eliminate many of their present problems.

THE MILLER AND MCGIRL DITCH COMPANY

The Miller and McGirl Ditch Company was incorporated in 1915 for 40 years with a capital stock of 600 shares of a par value of \$10 each or \$6000. The first stockholders were Charles O'Donnell, P. A. Evers, Solomon C. Toliver, E. B. Ryan and James M. Miller. The project is located about 12 miles northeast of Billings. The main canal is about four miles in length. The altitude of the project is about 3000 feet. Soils vary from a light sandy loam to a clay loam and in general are very productive. The average precipitation is about 12 to 13 inches. The topography is river bottom land sloping to the Yellowstone River, lying well for irrigation. The frost-free period averages approximately 135 days. There is some seepage on the project, but for the greater part this land has been reclaimed by drainage. Agriculture is highly developed with alfalfa, beets, small grains and beans being the principal crops. Considerable livestock is kept on the project with some dairying to supply local markets.

In 1942 there were 1,310.40 acres being irrigated with a potential acreage under existing works of 365.40 acres or a maximum irrigable acreage of 1,675.80 acres. The cost of water is about 75 cents an acre with 25 cents being used for operation and maintenance, the remainder for debt service. The present indebtedness of the Company is \$1400 or a little over \$1.00 an acre.

Water is taken by gravity from the Yellowstone River in the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 7, Township 1 North, Range 27 East. The water supply has been adequate except in dry years. In the spring of this year, 1943, a dam, which was constructed of rock and used to divert water from a secondary channel of the Yellowstone River into the Company's intake, was washed out by high water and ice. The Company is now making plans to replace this dam with a more permanent structure, as without some means of bringing the water

to their intake the Company may have a serious water shortage.

The main canal is 10 feet wide on the bottom and 12 feet wide across the top and is from 2 to 3 feet deep. The headgate is located about one-fourth of a mile below the intake. About one-fourth of a mile below the headgate the Company has a regulating structure with two gates. One gate is used to regulate the amount of water in the main canal, the other gate is used to spill any surplus water.

All rights of S. R. Miller and Thomas McGirl made previous to the incorporation of the Miller and McGirl Ditch Company were acquired by the Company. The first water filing on what is now the Miller and McGirl Ditch was made by S. R. Miller on December 24, 1890 for 1500 miner's inches. Water was to be taken from the Yellowstone River by gravity about four rods above the southwest corner of Section 5, Township 1 North, Range 27 East, on the north bank of the river. The purpose was for "irrigation, watering stock, domestic and other legal purposes." The ditch was to be six feet by four feet running over and upon said lands in a southeasterly direction. Said lands being: all of Section 5, Township 1 North, Range 27 East, and the south half of Section 33, Township 2 North, Range 27 East. The appropriation was made December 1, 1890.

On October 5, 1895 S. R. Miller et al (et al being Thomas McGirl) filed on an additional 2000 miner's inches of water to be taken by gravity from the Yellowstone River. The point of diversion being in Section 7 about 600 feet above the southwest corner of Section 5, Township 1 North, Range 27 East on the north bank of the river. This appropriation was to cover lands in: all north of the Yellowstone River in Section 5, 1 North 27 East, $W\frac{1}{2}NW\frac{1}{2}$, $NW\frac{1}{2}SW\frac{1}{2}$ in Section 4, 1 North 27 East, all of Section 33, 2 North 27 East, the above land being owned by S. R. Miller and the lands listed below being owned by Thomas McGirl: all north of the Yellowstone River in Sections 27, 35, 37, and $S\frac{1}{2}NW\frac{1}{2}$, $SW\frac{1}{2}$, $W\frac{1}{2}SE\frac{1}{2}$ of Section 26, and fractional land along the north side of the railroad right-of-way in 2 North 27 East. And should there be a surplus of water it is to be used on other lands they may acquire or to sell to others. Ditch, headgates and dam were heretofore owned and used by S. R. Miller. Ditch runs northeast from where it tops river to, over and upon lands, ditch being 7 feet wide on bottom thereof at the head and 9 feet across the top and 2 feet deep. To be enlarged 3 feet on bottom, 3 feet on top and extend its present terminus down to and upon lands of Thomas McGirl. Fifteen hundred inches of water of said river were appropriated by said S. R. Miller December 24, 1890.

On June 17, 1905 S. R. Miller and Thomas McGirl made an additional filing for 50 cubic feet per second to be taken from the Yellowstone River by gravity. This appropriation was for land included in the above appropriation and for the same purpose described therein. The description of the system shows a change. It is

described as; "a dam across an arm of the Yellowstone River near the southwest corner of the NE $\frac{1}{4}$ -NE $\frac{1}{4}$ of Section 7, Township 1 North, Range 27 East. Another dam at a point where the ditch taps the river and a dyke built between dams. A headgate at each dam. Ditch diverting water from river is 10 feet wide on bottom and 12 feet wide across the top. The ditch is from 2 to 3 feet deep, running northeast. To be used and controlled in manner stipulated in agreement made on October 5, 1895. Said water is appropriated in addition to the 2000 miner's inches of water heretofore appropriated on October 5, 1895. This 50 cubic feet per second appropriated June 15, 1905." The appropriation is on file in the Yellowstone County Courthouse, Billings, Montana, in Book E, Pages 42 and 77, and Book C, Page 51, and Book 1, Page 70 of Miscellaneous Records.

THE OLD MILL DITCH COMPANY

The Old Mill Ditch Company project is located on the north side of the Yellowstone River in Stillwater and Yellowstone Counties. The project extends from about one and one-half miles west of Park City to the vicinity of Laurel.

The topography for the most part is fairly even. The soils are brown in color and run from a sandy loam to a clay loam with occasional outcrops of gravel. The entire system is gravity with no structures of any consequence. The capacity of the ditch is not known, but is estimated to be about 3000 miner's inches. There is considerable seepage on the project. A large percentage of the seeped land is now used for pasture land, and the farmers in the area claim that unless a master drainage system is installed they would rather operate under the present conditions than have a partial drainage system constructed. The elevation of the project is about 3200 feet. It is estimated that the annual precipitation is about 13 inches and the average frost-free period approximately 130 days. Park City and Laurel are the principal shipping points and also provide a local market for some products. Billings, 15 miles east of Laurel, is the most important market. The principal crops are small grains, hay, beans and beets. Considerable livestock is kept on the project and some winter feeding is done. Agriculture is highly developed.

Water is taken by gravity from the Yellowstone River and diverted through the same headgates as those used by the Italian Ditch Company. About 1933 the Yellowstone River changed its course and left the original headgate high and dry. These being extremely dry years very little water was available and the Company was faced with the problem of supplying water to its users. At the same time the Italian Ditch Company was also having trouble supplying water to its users. The Italian headgate was located on the same channel

just above the Old Mill headgate. The two companies decided to construct a new intake and headgate about one and one-half miles upstream, on the main channel of the Yellowstone River and divert water into the old channel of the river on which their headgates were located. This plan called for the abandonment of the Old Mill headgate, using only the Italian headgate on the old channel. This headgate is now used to divert water for both the Old Mill and Italian Ditches. The water for the Old Mill Ditch is carried to Valley Creek at which point it is spilled and diverted into the main canal of the Old Mill Ditch Company. Construction and maintenance charges for the new portion of the ditch were divided between the two companies each paying 50 percent of the costs. This portion of the ditch is still operated under this agreement. The two systems also jointly employ one ditch rider. Since construction of the new headgate the supply of water is always plentiful.

The Old Mill Ditch Company was incorporated February 21, 1893. The Company was reincorporated in 1933 for a period of 40 years with a capital stock of 600 shares of a par value of \$10 each or \$6,000. The indebtedness at present is \$3,500, or about \$1.50 per acre. The cost of water averages about \$1.00 per acre. According to our records for 1942 there were about 2,100 acres of irrigated land embodied in the system of which 1,581.88 acres are in Yellowstone County with a potential acreage under existing works of 138 acres also in Yellowstone County.

Mr. E. L. Fenton, who has been secretary of the Old Mill Ditch Company for some 30 years, does not know if a water filing was ever made. There is no record of a water filing in his records. In the appropriations of Stillwater, Yellowstone and Carbon Counties we were unable to find any records pertaining to the Old Mill Ditch. According to Mr. Fenton and Mr. L. A. Nutting, who are both old-timers in the area, the first use was made by two or three farmers who operated a private ditch in the late eighties. A grist mill was also operated by water from this same ditch, hence the name Old Mill Ditch. About 1890 the mill was destroyed by fire which terminated its existence. On February 25, 1893 the farmers in the area held a meeting and decided to enlarge and extend the Old Mill Ditch and formed a company which should be known as the "Old Mill Ditch Company."

THE PETE COOPER FLAT IRRIGATION COMPANY

The Pete Cooper Flat Irrigation Company was incorporated September 4, 1903. The ditch company records do not show when the ditch was constructed, but, according to John Bollinger, who is secretary and treasurer of the company, construction was completed in the spring of 1904. Under the original incorporation there were

five shares of stock issued, each share representing 50 miner's inches. From this information it is assumed that the original amount of water appropriated was 250 miner's inches. The first stockholders were James McBride and Pete Cooper who constructed the said ditch. As there are only four water users in the company assessments are made only for the ditch maintenance with no fixed charge for any specific year.

The total length of the main ditch is about three miles. The point of diversion is in the NE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 35, Township 1 South, Range 25 East. The headgate on the main ditch is in bad condition and needs repair.

The project is located about four miles southwest of Billings on the south side of the Yellowstone River. The elevation of the project is about 3100 feet. The topography of the land is favorable to irrigation. The irrigable area of the project is given at about 640 acres. Soils are a loam to a silt loam and are considered to be highly productive. Farming is diversified and highly developed.

The main ditch for the project follows the base of some steep and badly eroded hills from which the spring run-off and heavy rain fill in the ditch with silt and debris. At the present time the lower end of this ditch is not usable because of silt. The project has purchased a steam shovel with which they hope to keep the ditch in operation.

In 1942 there were 313.60 acres being irrigated with a potential acreage on present irrigated farms of 33.70 acres.

THE SUBURBAN DITCH COMPANY

On February 23, 1896 George S. Lamport, A. D. Newman, D. E. Jones, J. J. Davis and I. D. O'Donnell associated together to form the Suburban Ditch Company. The Suburban Ditch Company project is located within and just southwest of the city of Billings. In 1942 there were 98 shareholders in the Company with the greater percent of these irrigating from one to ten acres of land. The gross area of the project is said to be about 1200 acres with 1,051.40 acres being irrigated in 1942. Water is taken by gravity from the Yellowstone River in the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ in Section 25, Township 1 South, Range 25 East.

The total length of the main canal is about three and one-half miles. The water supply is adequate even in dry years. The project has some seepage which is caused mostly from uncontrolled waste water. The headgate on the main canal is an old wooden structure which has been in use for about 20 years. Plans have

been made to replace it as it could be washed out during the high-water season leaving the project with a water shortage. The project also uses waste water from the Hogan Slough as an auxiliary supply. This waste water, for the greater part, is from Canyon Creek Ditch. The main Suburban Ditch ends in the city of Billings and runs into the city trunk sewer near where U. S. Highway No. 10 underpasses the Northern Pacific Railroad tracks on the west side of Billings.

The Suburban Ditch Company was reincorporated May 31, 1937 with a capital stock of 600 shares of a par value of \$10 each or \$6000. Of the total 600 shares 552.5 have been issued. The Company has no indebtedness and has some money in reserve. The water charge runs from 75 cents to one dollar per acre. This charge is for operation and maintenance only and is determined by the stockholders each year.

An intensive system of farming is practised with truck crops utilizing most of the acreage with some sugar beets and hay on the larger units. There are some dairy cows and poultry with very little other livestock. The soil is a loam to a silty loam and is very productive. The elevation of the project is about 3117 feet.

On June 1, 1896 the Suburban Ditch Company appropriated and filed on 5000 miner's inches of water to be taken from the Yellowstone River by gravity 1600 feet south and 44 degrees east from the section corner of Sections 23, 24, 25 and 26, Township 1 South, Range 25 East which is on the north bank of the river. The purpose was for irrigation, to water stock, mining, milling and domestic uses. The system was to be of a dam and a ditch 72 inches wide on the bottom, 168 inches across the top by 48 inches deep, running northeast to the point of final discharge in the SW $\frac{1}{4}$ of Section 27, Township 1 North, Range 26 East. The place of intended use was given as lands in Sections 17, 16, 15, 8, 9, 10, 11, 4, 3, and 2 in Township 1 South, Range 26 East. Also Sections 32, 33 and 34 in Township 1 North, Range 26 East. The appropriation is filed in Book 2, Page 88 of Miscellaneous Records in Yellowstone County.

THE VICTORY IRRIGATION DISTRICT

What is now the Victory Irrigation District was formerly the Big Horn Ditch Company. The Big Horn Ditch Company was organized and incorporated in 1908. A ditch and irrigation works were constructed. On September 9, 1908 the Big Horn Ditch Company appropriated 3600 miner's inches, or 90 cubic feet per second, of the waters of the Big Horn River to be taken by gravity in the northwest corner of Lot 11, Section 5, Township 3 North, Range 34 East.

The Company was organized for the purpose of irrigating all lands below the main canal which were owned by the stockholders in said canal.

In 1919 the Victory Irrigation District was formed and all the rights and property of the Big Horn Ditch Company were purchased by the Victory Irrigation District. Bonds were sold to the Union Trust Company of Spokane, Washington in the amount of \$52,000. A canal was built nine miles in length, with an adequate headgate and diversion dam. It was necessary to build the canal about two miles upstream beyond the District boundary in order to secure sufficient gravity to carry the water to the lands of the District. Most of this distance required a deep cut and was built with almost no grade. As a result the silt from the Big Horn River and the wash from cut banks make this portion of the ditch extremely difficult to keep clean. Because of this condition there were several years during the period of 1930 to 1935 that the ditch failed to function and the District was considered as dry land. During this period crops were a failure and most of the farmers could not pay their taxes.

In 1931 the District spent over \$1000 to clean the main canal, but the silt closed the upper part of the canal in a matter of days, so they were unable to do any irrigating that year. Outside of the first two miles of ditch the District has had very little trouble with the main canal. The District has also had trouble with high water under-mining their headgate and diversion dam to such an extent that the District at times could not get any water into the canal without replacing the works or making repairs.

In 1934 the District made application for a loan from the Reconstruction Finance Corporation not to exceed \$15,000 for re-funding purposes and a loan not to exceed \$7,500 for construction purposes. The plan was to use the construction loan to build a pumping station with the necessary pumps, to clean out its canal, to make a connection between the pumping station and canal and put their irrigation system in first class condition. This plan called for the abandonment of the first two miles of the ditch. The necessary lift at the pumping station would have been five feet during high water and ten feet when the river is at its low stage. This plan was not carried out as the District was not able to secure the R. F. C. loan.

On September 2, 1938 the owners of the lands in the Victory District filed a written consent giving permission to O. H. Hovda to purchase 114 bonds in the amount of \$500 each, or a total of \$57,000, payable as follows: \$1000 in August 3, 1938, \$1000 in January 1, 1939, \$1000 on January 1, 1940, \$1000 on January 1, 1941, \$1000 on January 1, 1942 and \$700 on January 1, 1943, all of said installments to bear interest at the rate of eight percent per annum from date until paid. On June 4, 1943 all of this amount except \$200 was paid by the District and they plan to have this amount paid

by the end of 1943. The District is now in a better financial condition than it has been at any time in the past and should be able to go ahead and make developments on the project.

The average elevation of the project is about 2692 feet. The frost-free period is about 135 days. The annual precipitation is about 13 inches. The soil is a sandy loam of a fine texture which is said to be exceptionally productive under irrigation. Crops raised in the District are alfalfa, beans, sugar beets and small grains. There is considerable livestock on the project as the adjoining hills offer good summer grazing.

The District is located on the west side of the Big Horn River, a tributary of the Yellowstone River, about five miles above their junction, which is about one mile east of Custer, Montana and 60 miles east of Billings, Montana. There are high hills to the west and east of the District which form the eastern and western boundaries of the Big Horn Valley in which the District is located. Parts of the District are rough and need land leveling. The remainder is from a gentle slope to very flat country and it is felt that drainage would be a serious problem if the water supply were adequate. The gross area of the project is about 2000 acres with 1644.19 classified as irrigable. In 1942 there were 1,431.40 acres being irrigated with a potential acreage under existing works of 224.00 acres or a maximum irrigable acreage of 1,655.40 acres. The average size of the farms is about 140 acres.

The water cost was \$1.50 per acre for the years 1941 and 1942. As soon as the present debt is paid the District plans to lower this charge to about 50 cents per acre. The cost of water includes operation and maintenance of canal, repairs, interest on borrowed money and repayment of old debts.

There is some seepage on the project, but to date no drainage systems have been installed. The project is in need of a good dam across the Big Horn River at the point of diversion. The rock dam now used works with some success, but in case of extremely high water it could be washed away leaving the District with little or no water at their headgate. The District has installed waste ways above the cut which has decreased the accumulation of silt in the portion of the ditch previously troubled. The District plans to install one or two more waste ways which they feel will take care of the silt sufficiently so that silt will no longer be a problem.

In 1919 the District made a water filing under the laws of Montana for 3600 minor's inches, or 90 second feet, of water to be taken by gravity from the Big Horn River. This is more than is needed for the irrigation of all the lands in the District. The water supply is considered adequate except in dry years.

THE WACO-CUSTER DITCH COMPANY

The Waco-Custer Ditch Company was incorporated in 1907 with a capital stock of 1482 shares of a par value of \$20 each. On July 27, 1907 the company appropriated 5000 minor's inches, or 125 cubic feet per second, of water which was taken by gravity from the Yellowstone River in Section 6, Township 3 North, Range 32 East on the south side of the river.

At present the company has two diversion dams constructed of brush, wood piling and concrete, one being across a minor channel and the other being across the major channel of the Yellowstone River, diagonal to its course. Both dams are so constructed that they divert the flow of the river through the headgate and into the main canal. The main canal is 14 feet wide. The present headgate is located on the south bank of the river at a point in Lot 1, Section 1, Township 3 North, Range 31 East. From this point the main ditch runs in a northeasterly direction for about 17 miles. In addition to the two diversion dams water is diverted through a tunnel which is about one-quarter of a mile in length. Before the dams and tunnel were constructed the water charge was from \$4.00 to \$5.00 an acre and the company was unable to divert sufficient water to supply the demands of all the water users.

Stock in the Company was originally issued on the basis of one share for each two acres of land. The present outstanding indebtedness is \$34,000 or about \$11 per irrigable acre. Per acre assessments are now about \$2.50 of which 80 cents is for operation and maintenance. The Company does not maintain a lateral system but delivers water only out of the main canal.

In 1942 there were 3,258.32 acres being irrigated with a potential acreage under existing works of 1,107.40 acres or a maximum irrigable acreage of 4,365.72 acres. Since the construction of the dams the water supply has been adequate throughout the irrigation season. Some seepage has occurred on the project but not enough to warrant the construction of a drainage system.

Alfalfa and sugar beets are the principal crops, with beans, peas and small grains grown throughout the project. Livestock and milk cows are kept on most farms, although not extensively. Some winter feeding of livestock from the near-by ranges is done.

The project is located on the south side of the Yellowstone River and extends about 13 miles west and 4 miles east of the town of Custer which is the principal shipping point. The elevation at Custer is 2749 feet. The frost-free period is about 135 days, while the annual precipitation is about 13 inches. The soils are mostly a heavy silt loam of good productivity.

On March 17, 1923 the Waco-Custer Ditch Company appropriated 5000 miner's inches, or 125 cubic feet per second, of water to be taken from the Yellowstone River by gravity. The filing was made March 28, 1923. The original place of diversion was shown as a point in Section 6, Township 3 North, Range 32 East on the south bank. In 1918 the point of diversion was changed to a point 300 feet northeast of mile post 186 of the Northern Pacific Railroad Company, on the main line of its road between Glendive and Billings, which is located on the south bank of the Yellowstone River in Lot 1 of Section 1, Township 3, North, Range 31 East. The purpose was to be for irrigation and other uses. The system was described as dam, headgate and ditch 14 feet wide on bottom with a side slope having a ratio of one to one. Water was first appropriated on July 27, 1907 and has been used continuously since that date. The appropriation is on file in the Yellowstone County Courthouse in Billings Montana on Page 511 of Book P of Miscellaneous Records.